Supreme Court, U.S.

06136 2007

No. OFFICE OF THE CLERK

IN THE

Supreme Court of the United States

AKEVA L.L.C.,

Petitioner,

v.

ADIDAS AMERICA, INC.,

Respondent.

On Petition for a Writ of Certiorari to the United States Court of Appeals for the Federal Circuit

PETITION FOR A WRIT OF CERTIORARI

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QUESTIONS PRESENTED

1. Whether the Federal Circuit contradicts core principles of patent law and its own settled precedent by holding that, absent a clear disavowal of the ordinary meaning of a patent claim term, a different meaning may be ascribed to such a term based upon equivocal language from the patent specification.

2. Whether the Federal Circuit, purporting to apply its own de novo standard of review mandated by *Cybor Corp. v. FAS Technologies, Inc.*, 138 F.3d 1448 (Fed. Cir. 1998), may defer to a district court if the Federal Circuit simply concludes that some evidence supports the district court's analysis and conclusions.

3. Whether a court construing the meaning of a patent claim may categorically refuse to consider highly probative claim differentiation in ancestral patents based on immaterial differences in the patent specifications.

RULE 29.6 STATEMENT

Petitioner Akeva L.L.C. states that it is not a publicly traded company, that it has no parent corporation, and that no publicly held company owns 10% or more of its stock.

PARTIES TO THE PROCEEDING

Pursuant to Rule 14.1(b), the following list identifies all of the parties appearing here and before the United States Court of Appeals for the Federal Circuit in this matter:

Akeva L.L.C. (Petitioner/Appellant)

Adidas America, Inc. (Respondent/Appellee)

Adidas-Salomon AG (Appellee)

TABLE OF CONTENTS

QUESTIONS PRESENTED i

RULE 29.6 STATEMENT ii

PARTIES TO THE PROCEEDING iii

TABLE OF AUTHORITIES vi

OPINIONS BELOW 1

JURISDICTION 1

STATUTORY PROVISION AT ISSUE 1

STATEMENT OF THE CASE 2

A. Factual Background 5

B. District Court Proceedings 7

C. Proceedings Before the Federal Circuit 10

REASONS FOR GRANTING THE PETITION 13

I. CERTIORARI SHOULD BE GRANTED TO REMEDY THE FEDERAL CIRCUIT'S CONTINUED FAILURE TO SET FORTH AN INTELLIGIBLE STANDARD FOR DISCERNING WHEN PATENT CLAIMS MAY BE READ CONTRARY TO THEIR ORDINARY MEANING 13

II. THIS COURT'S INTERVENTION IS NEEDED TO ENSURE THAT THE FEDERAL CIRCUIT ACTUALLY CONDUCTS THE CRITICAL DE NOVO CLAIM CONSTRUCTION ANALYSIS THAT IT PURPORTS TO REQUIRE 25

III. THIS COURT SHOULD RECTIFY THE FEDERAL CIRCUIT'S REFUSAL TO CONSIDER HIGHLY PROBATIVE ANCESTRAL PATENTS 28

CONCLUSION 30

Appendix A

Akeva L.L.C. v. Adidas-Salomon AG et al., No. 06-1090, 2006 U.S. App. LEXIS 28195 (Fed. Cir. Nov. 13, 2006) 1a

Appendix B

Akeva L.L.C. v. Adidas America, Inc., 385 F. Supp. 2d 559 (M.D.N.C. Aug. 2005) 10a

Appendix C

Akeva L.L.C. v. Adidas America, Inc., No. 03-CV-1207, 2005 U.S. Dist. LEXIS 11213 (M.D.N.C. May 17, 2005) 25a

Appendix D

Order Denying Rehearing and Rehearing En Banc, *Akeva L.L.C. v. Adidas-Salomon AG et al.*, No. 06-1090 (Fed. Cir. Jan. 12, 2007) 66a

Patent Appendix A

U.S. Patent No. 6,604,300 ("'300 Patent") 1a

Patent Appendix B

U.S. Patent No. 6,662,471 ("'471 Patent") 49a

TABLE OF AUTHORITIES

CASES

Akeva L.L.C. v. Mizuno Corp., 243 F. Supp. 2d 418 (M.D.N.C. 2003) 7

Akeva L.L.C. v. New Balance Athletic Shoe, Inc., No. 03-CV-1044 (M.D.N.C. filed Nov. 4, 2003) 7

Alloc, Inc. v. United States Int'l Trade Comm'n, 342 F.3d 1361 (Fed. Cir. 2003), ... 24

Amgen Inc. v. Hoechst Marion Roussel, Inc., 457 F.3d 1293, *reh'g denied*, 469 F.3d 1039 (Fed. Cir. 2006), *pet. for cert. filed*, No. 06-1291 (March 22, 2007) 25, 28

Amgen Inc. v. Hoechst Marion Roussel, Inc., 469 F.3d 1039 (Fed. Cir. 2006) (en banc) 20

Andersen Corp. v. Fiber Composites, LLC, 474 F.3d 1361 (Fed. Cir. 2007) 20

CCS Fitness, Inc. v. Brunswick Corp., 288 F.3d 1359 (Fed. Cir. 2002) 17

Comark Commc'ns., Inc. v. Harris Corp., 156 F.3d 1182 (Fed. Cir. 1998) 4, 15, 29

Continental Paper Bag Co. v. E. Paper Bag Co., 210 U.S. 405 (1908) 13

Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448 (Fed. Cir. 1998) 5, 25, 26, 28

Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722 (2002) 22, 23

General Elec. Co. v. Wabash Appliance Corp., 304 U.S. 364 (1938) 13, 14

Golight, Inc. v. Wal-Mart Stores, Inc., 355 F.3d 1327 (Fed. Cir. 2004) 20

Goldenberg v. Cytogen, 373 F.3d 1158 (Fed. Cir. 2004) 30

Hockerson-Halberstadt, Inc. v. Avia Group Int'l, 222 F.3d 951 (Fed. Cir. 2000) 16, 17

Hoganas AB v. Dresser Indus., Inc., 9 F.3d 948 (Fed Cir. 1993) 27

Honeywell Int'l, Inc. v. ITT Indus., 452 F.3d 1312 (Fed. Cir. 2006) 20, 21

Howe Machine v. National Needle, 34 U.S. 388 (1890) 14

Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc., 381 F.3d 1111 (Fed. Cir. 2004) 15

Johnson Worldwide Assoc., Inc. v. Zebco Corp., 175 F.3d 985 (Fed. Cir. 1999) 17

Jonsson v. Stanley Works, 903 F.2d 812 (Fed. Cir. 1990) 29

Key Pharms. v. Hercon Labs. Corp., 161 F.3d 696 (Fed. Cir. 1998) 26

Keystone Bridge Co. v. Phoenix Iron Co., 95 U.S. 274 (1877) 14

Liebel-Flarsheim v. Medrad, Inc., 358 F.3d 898 (Fed. Cir. 2004) 16, 17, 20, 29

LNP Eng'g Plastics v. Miller Waste Mills, 275 F.3d 1347 (Fed. Cir. 2001) 26

Markman v. Westview Instruments, Inc., 517 U.S. 370 (1996) 2, 7, 8, 13, 14, 28

McCarty v. Lehigh Valley Pub. R.R. Co., 160 U.S. 110 (1895) 13

Microsoft Corp. v. Multi-Tech Sys., Inc., 357 F.3d 1340 (Fed. Cir. 2004) 29

Minnesota Mining and Mfg. Co. v. Chemque, Inc., 303 F.3d 1294 (Fed. Cir. 2002) 26

nCube Corp. v. Seachange Int'l, Inc., 436 F.3d 1317 (Fed. Cir. 2006) 21

NTP, Inc. v. Research in Motion, Ltd., 418 F.3d 1282 (Fed. Cir. 2005) 21, 29

Nystrom v. Trex Co., Inc., 424 F.3d 1136 (Fed. Cir. 2005) 21

Omega Eng'g, Inc. v. Raytek Corp., 334 F.3d 1314 (Fed. Cir. 2003) 17

Phillips v. AWH Corp., 376 F.3d 1382 (Fed. Cir. 2004) (en banc) 17

Phillips v. AWH Corp., 415 F.3d 1303 (Fed. Cir. 2005) (en banc) 1, 3, 18, 19, 20, 21

SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc., 242 F.3d 1337 (Fed. Cir. 2001) 11, 15, 17

Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313 (Fed. Cir. 2002) 16, 17, 24

Texas Digital Sys., Inc. v. Telegenix, Inc., 308 F.3d 1193 (Fed. Cir. 2002) 16

United States v. Adams, 383 U.S. 39 (1966) 14

University of Rochester v. G.D. Searle & Co., 358 F.3d 916 (Fed. Cir. 2004) 13

Utah Med. Prods. v. Graphic Controls, 350 F.3d 1376 (Fed. Cir. 2003) 26

Vitronics Corp. v. Conceptronic Inc., 90 F.3d 1576 (Fed. Cir. 1996) 16

White v. Dunbar, 119 U.S. 47 (1886) 14

STATUTES AND REGULATIONS

28 U.S.C. § 1254(1) 1

28 U.S.C. § 1295(a) 15

35 U.S.C. § 112 ..... 1, 2, 6, 13

35 U.S.C. § 120 7

35 U.S.C. § 154(a)(2) 7

37 C.F.R. § 1.53(b)(2) 7

RULES

Fed. R. Evid. 201(d) 27

S. Ct. R. 10(c) 25

Fed. Cir. R. 32.1(c) 10

Fed. Cir. R. 47.6 (2006) 10

MISCELLANEOUS

Holly L. Bonar, *Is Something Amiss? A Commentary on the Aftermath of* Phillips v. AWH Corp., 88 J. Pat. & Trademark Off. Soc'y 513 (2006) 18, 21

William H. Burgess, *Comment: Simplicity at the Cost of Clarity: Appellate Review of Claim Construction and the Failed Promise of* Cybor, 153 U. Pa. L. Rev. 763 (2004) 26

DONALD S. CHISUM, CHISUM ON PATENTS (2005 & 2007 Supp.) 16, 21

Crissa A. Cook, *Comment: Constructive Criticism:* Phillips v. AWH Corp. *and the Continuing Ambiguity of Patent Claim Construction Principles*, 55 Kan. L. Rev. 225 (2006) 18, 21

ROBERT L. HARMON, PATENTS AND THE FEDERAL CIRCUIT (6th ed. 2004 Supp.) 17

R. CARL MOY, MOY'S WALKER ON PATENTS (2006) .. 16, 21

David Sanker, *Note:* Phillips v. AWH Corp.*: No Miracles in Claim Construction*, 21 Berkeley Tech. L.J. 101, 114 (2006) 19, 24

U.S. Opp., *Alloc, Inc. v. United States Int'l Trade Comm'n*, No. 03-1187 (2004) 24

OPINIONS BELOW

The opinion of the United States Court of Appeals for the Federal Circuit is unreported and is reprinted in the Appendix to the Petition ("Pet. App.") at 1a-9a. The Federal Circuit denied Petitioner Akeva L.L.C.'s ("Akeva's") petition for rehearing or rehearing en banc in an unpublished order. *Id.* at 66a-67a.

The District Court's claim construction decision is unreported and is reprinted at Pet. App. 25a-65a. The District Court's order concerning the impact of *Phillips v. AWH Corp.*, 415 F.3d 1303 (2005) (en banc), and denying Akeva's motion for reconsideration, is reported at 385 F. Supp. 2d 559 (M.D.N.C. 2005), and is reprinted at Pet. App. 10a-24a.

JURISDICTION

The Federal Circuit issued its decision on November 13, 2006. Pet. App. 1a. Petitioner's petition for rehearing or rehearing en banc was considered by the Federal Circuit and denied on January 12, 2007. *Id.* at 67a. This Court has jurisdiction pursuant to 28 U.S.C. § 1254(1).

STATUTORY PROVISION AT ISSUE

In relevant part, 35 U.S.C. § 112 provides:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

STATEMENT OF THE CASE

This case perfectly exemplifies the Federal Circuit's confounding and unpredictable approach to patent claim construction – an approach that cries out for this Court's intervention. In the decision below, the Federal Circuit disregarded the ordinary meaning of a straightforward claim term, which had been expressly adopted by the United States Patent and Trademark Office ("PTO"), in order to reach a preferred result of denying the inventor the full breadth of his patented claims. Contradicting years of its own precedent, the Federal Circuit cursorily affirmed the district court's claim construction ruling without establishing that the patent specification indicated a clear disavowal of the ordinary meaning of the claim term at issue and without conducting a true de novo analysis.[1]

In the decision below, the Federal Circuit refused to honor Petitioner Akeva's rights in a patented "flexible member" technology for athletic shoes, which provides improved cushioning and spring.[2] Despite clear language in

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[1] Consistent with this Court's practice and common usage, *see Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 378-79 (1996), the non-claim portion of the patent specification will be referred to as the "specification," although 35 U.S.C. § 112 refers to the non-claim portion as the "written description."

[2] For purposes of this Petition, "flexible member" is an inclusive term referring to the enhanced spring aspect of Petitioner's

Akeva's patent claims covering flexible members in *all* shoes – regardless of whether the rear soles are conventional, detachable, or rotatable – the Federal Circuit limited Akeva's patent protection to flexible members in the virtually nonexistent set of shoes with detachable or rotatable rear soles. The deficiency of the Federal Circuit's outcome-oriented approach is laid bare by, among other things, the fact that to reach its chosen outcome, the Court divergently interpreted, in two separate but closely linked patents, the *same* claim term drafted by the *same* inventor in the *same* field of invention – in neither case giving the term its ordinary meaning. Specifically, the Court determined that "secured" did not simply mean "attached." Rather, for one of the patents at issue, the Federal Circuit interpreted "secured" to mean "detachably secured." Pet. App. 5a. And for the other patent – in order to circumvent the patent's clear statement that it applied to shoes with "permanently attached rear soles" as well as detachable ones – the Federal Circuit interpreted "secured" to mean "secured to the shoe, but not permanently fixed." *Id.* at 8a-9a. This tortured reasoning and result belie an ends-oriented approach that ignores basic claim construction principles.

The Federal Circuit's disarray concerning whether, if ever, it is appropriate to read limitations into the ordinary meaning of claim language is nothing new. What is new, however, is clear proof that the Federal Circuit is not able to resolve this problem on its own. In its en banc ruling in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005), the Federal Circuit purported to bring clarity to this issue. But that decision only made matters worse, as made clear by

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invention. One patent at issue covers a "flexible plate," whereas the other covers a flexible, U-shaped member.

practice since *Phillips*, including the decision below. Not only did *Phillips* confusingly reaffirm starkly conflicting strands of its own precedent – explaining why nearly all of the Federal Circuit judges were able to concur in the Court's articulation of the basic principles of claim construction – but *Phillips* also has now been read by various Federal Circuit panels, including the panel below, as having implicitly overruled the longstanding principle that a "heavy presumption" attaches to a claim term's ordinary meaning. to one skilled in the art. Thus, since *Phillips*, the Federal Circuit's claim construction decisions have been anything but predictable: some, citing *Phillips*, continue to accord a patent term's ordinary meaning the utmost weight, whereas others invoke *Phillips* to justify casually importing limitations from the patent specification into otherwise clear claim language. Because *Phillips* provides something for everyone, it has ushered in a new era of incoherence and unpredictability in the Federal Circuit.

Without a heavy presumption that claim terms have their ordinary meaning, there can be no coherent, fair, or predictable way for courts to patrol the "fine line between reading a claim in light of the specification, and reading a limitation into the claim from the specification." *Comark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1186 (Fed. Cir. 1998). Although this Court has repeatedly recognized the importance of maintaining this line, it has not yet intervened, allowing the Federal Circuit the opportunity to resolve this important and recurring issue on its own. Because the Federal Circuit has now conclusively proven its inability to do so, the time for this Court's intervention has arrived. This case provides an ideal vehicle because the Federal Circuit's refusal to apply the heavy presumption of ordinary meaning of "secured" was conclusive.

The decision below suffers from two additional errors reflecting rifts within the Federal Circuit, both of which also warrant review. *First*, the Federal Circuit – as is too often the case – failed to engage in a de novo review of the District Court's claim construction, as the Federal Circuit has required since *Cybor Corp. v. FAS Technologies., Inc.*, 138 F.3d 1448 (Fed. Cir. 1998). This Court's intervention is necessary to ensure that the Federal Circuit actually applies the de novo analysis it purports to require. Otherwise, as here, the Federal Circuit is prone to affirming a lower court's decision so long as *some evidence* supports the claim construction. *Second*, this Court's review is urgently needed to ensure that courts actually do consider all intrinsic evidence relevant to claim construction, as *Phillips* purports to require. Here, the Federal Circuit ignored highly probative evidence from ancestral patents, placing itself within an intracircuit divide over the appropriate use of such evidence. Guidance from this Court is necessary.

A. Factual Background

Petitioner Akeva is a company, owned in part by inventor David Meschan, that has been assigned certain patents created by Mr. Meschan. Mr. Meschan is an avid runner who has patented several innovations for the improvement of athletic shoes over the past eleven years. Two of his patented improvements to athletic shoes are relevant here. *First*, Mr. Meschan has patented various forms of a detachable/rotatable rear shoe sole that allows customization of the sole and can extend the life and performance of the shoe. *Second*, Mr. Meschan has patented various forms of a flexible member found within the rear sole of an athletic shoe, to enhance spring and cushioning.

Although this case involves two separate patents, U.S. Patent No. 6,604,300 (the "'300 patent") and U.S. Patent No. 6,662,471 (the "'471 patent"),[3] the same claim term – "secured" – is at issue. Both the '300 and '471 patents claim certain flexible members in athletic shoes. The claims of both patents define the covered class of shoes as having an "upper" portion with "a rear sole *secured* below" the upper. Pet. App. 3a (emphasis added). Thus, the patents cover all flexible member shoes with a "secured" rear sole.

In addition to describing the claimed flexible member, each patent specification also revisits the features of previously claimed detachable/rotatable rear soles as the inventor's "best mode contemplated . . . of carrying out his invention," commonly referred to as the "preferred embodiment." 35 U.S.C. § 112. Although the specifications explain that detachable/rotatable rear soles are the preferred embodiment, they also make clear that the flexible member "need not be used only in conjunction with a detachable rear sole, *but can be used with permanently attached rear soles as well*." Patent App. 35a ('300 patent) (emphasis added). Both patent specifications discuss detachable/rotatable rear soles not only because of the "preferred embodiment" requirement of 35 U.S.C. § 112, but also because both patents were issued by the PTO as continuations of earlier patents that had claimed various forms of a detachable/rotatable rear sole, in addition to disclosing the flexible member invention claimed by the '300 and '471 patents.[4]

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[3] The patents are reprinted in a separate Patent Appendix ("Patent App.") at 1a-48a ('300 patent) and 49a-88a ('471 patent).

[4] Frequently in continuation practice, an inventor will not remove material from the specification even though the newly asserted claims pertain to only a limited portion of the specification, or, in

After filing for patents on his rear sole and flexible member technologies in the mid-1990s, Mr. Meschan created prototypes and approached several leading shoe companies to assess their interest in licensing his patented technologies. Without licensing these technologies, some companies began using Akeva's patented technologies in their commercial shoe models. Based on patents similar to those at issue here, Akeva brought patent infringement suits against two leading companies, Mizuno and New Balance. *See, e.g.*, *Akeva L.L.C. v. Mizuno Corp.*, 243 F. Supp. 2d 418 (M.D.N.C. 2003); *Akeva L.L.C. v. New Balance Athletic Shoe, Inc.*, No. 03-CV-1044 (M.D.N.C. filed Nov. 4, 2003). As in this case, both suits claimed infringement by shoes that had a flexible member but did not have detachable/rotatable rear soles. Both suits settled prior to rulings on claim construction.

B. District Court Proceedings

Like Mizuno and New Balance, Respondent Adidas subsequently brought to market new shoe models that infringed on Akeva's flexible member technology. Because the Adidas shoes were covered by Akeva's '300 and '471 patents, Akeva brought suit against Adidas for patent infringement in the Middle District of North Carolina.

In advance of trial, the District Court held a *Markman* hearing to determine the proper construction of disputed claim terms in the '300 and '471 patents. *Markman v.*

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the case of a continuation-in-part, pertain to only the newly added portion of the specification. *See* 37 C.F.R. § 1.53(b)(2). Although continuations allow an inventor to maintain an earlier priority date, *see* 35 U.S.C. § 120, they have the drawback of providing a shorter period of patent coverage, because the term of a continuation patent is based on the start date of the first patent in the series, *see* 35 U.S.C. § 154(a)(2).

Westview Instruments, Inc., 52 F.3d 967, 976 (Fed. Cir. 1996), *aff'd* 517 U.S. 370 (1996). Notably, "secured" was only one of many terms disputed between the parties, and equal, if not greater, emphasis was placed by Adidas on the construction of several terms related to the focus of the '300 and '471 patent claims – the flexible member.

The District Court's claim construction decision largely adopted Akeva's proposed constructions, with the significant exception of the term "secured." Pet. App. 65a. The Court agreed with Akeva that the ordinary meaning of "secured" was "fastened" or "attached," *id.* at 37a, but concluded that Akeva had disclaimed the ordinary meaning for both patents. For the '471 patent, the Court interpreted "secured" to mean "a rear sole detachably secured below a portion of the upper." *Id.* at 47a. For the '300 patent, the District Court interpreted "secured" to mean "a rear sole selectively or permanently fastened, but not permanently fixed in position." *Id.* at 45a.[5] The Court concluded that Akeva had disclaimed the ordinary meaning of "secured" without addressing contrary evidence cited by Akeva and based on its view that a disclaimer "need not be explicit." *Id.* at 33a. The Court's approach to disclaimer reflected its observation

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[5] The Court interpreted "secured" in this strained manner in an attempt to account for the '300 patent specification's statement that the claimed flexible member "need not be used only in conjunction with a detachable rear sole, but can be used with permanently attached rear soles as well." Pet. App. 40a-41a. Rather than give "permanently attached" its inclusive ordinary meaning, the District Court limited that term by implication, citing several portions of the specification in purported support of defining "permanently attached" as "rotatable." *Id.* at 38a-39a, 41a. In fact, the '300 patent contains only one passing mention of a rear sole that is rotatable but not removable. *Id.* at 41a.

that the "somewhat inconsistent" analyses "advocated by the parties" *both* "are supported by Federal Circuit precedent." *Id.* at 35a. Because "[o]ver the years, the Federal Circuit had "taken two approaches to claim construction" – one "focused on the claim language and a second focused on the specification that is more likely to read limits into the claim" – the District Court expressed a hope that the forthcoming en banc decision in *Phillips* would "settle several questions on the appropriate method of analysis." *Id.* at 35a-36a.

On Akeva's motion for reconsideration, the District Court reaffirmed its *Markman* ruling in light of the *Phillips* en banc decision. Pet. App. 10a. The Court perceived a "renewed emphasis on the specification" in *Phillips*, which "lends strong support to the notion that a disclaimer or disavowal found in the specification cannot be ignored in construing claim terms." *Id.* at 16a. Thus, the Court reiterated that language in the '300 and '471 patent specifications "serves to limit" the ordinary meaning of "secured," *id.* at 19a, despite that ancestors of the patents distinguished between "secured" and "detachably secured" in claim language, *id.* at 17a. Finally, the District Court refused to consider a remark by the '300 patent examiner made during the prosecution of a continuation patent that the examiner always considered "secured" to have its ordinary meaning of "fastened" or "attached." *Id.* at 21a-22a.[6]

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[6] The Court claimed in a footnote that the patent examiner's statement was unhelpful because she did not elaborate on what the ordinary meaning was, Pet. App. at 22a, but as Akeva's District Court briefing made clear, the patent examiner's statement came in response to a filing by Akeva that stated that the "ordinary" meaning of "secured" would be "fastened" or "attached." Dist. Ct. Doc. 135 (Akeva Mot. for Partial Recon. filed June 6, 2005), at 5.

C. Proceedings Before the Federal Circuit

Because the District Court's claim construction decision was determinative of its infringement claims, Akeva accepted a summary judgment of non-infringement and appealed the District Court's construction of "secured" in both patents. The Federal Circuit affirmed.[7]

Citing *Cybor*, the Federal Circuit stated that "[a] district court's claim construction findings are reviewed de novo on appeal." Pet. App. 2a. However, the Court did not engage in a de novo analysis. It simply cited the strongest evidence it could find to support the District Court's conclusions, which it refused to "disturb." *Id.* at 6a; *see id.* at 8a (stating that the evidence cited by the District Court "supports [the] finding" it had reached). Thus, the Federal Circuit reached the same idiosyncratic conclusions as the District Court: for the '471 patent, the word "secured" meant "shoes with detachable heels," *id.* at 6a, whereas for the '300 patent, "secured" meant "shoes with rear soles that are secured to the shoe, but not permanently fixed." *Id.* at 9a.

The Federal Circuit's conclusions were based on its understanding that, pursuant to *Phillips*, "[t]he ordinary meaning of a term may be narrowed when interpreted in light of the specification." Pet. App. 4a. Thus, although reaching the same result as the District Court, the Federal

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[7] Pursuant to Federal Circuit Rule 47.6, the Court designated its opinion as "not citable as precedent." Pet. App. 1a. Since then, the Federal Circuit has deleted Rule 47.6 and adopted Federal Circuit Rule 32.1 to allow, consistent with the revised Federal Rules of Appellate Procedure, the citation of "nonprecedential dispositions issued after January 1, 2007." Fed. Cir. R. 32.1(c). This Court has not allowed the Federal Circuit's routine use of the "nonprecedential" designation to circumvent its review.

Circuit disagreed with the District Court's determination that the ordinary meaning of "secured" encompassed *all* shoes. To the contrary, citing *Phillips*, the Federal Circuit concluded that the District Court's strained construction of "secured" in the '471 patent "does not take the term outside its ordinary meaning," but merely "interpret[s the term] as it is used in accordance with the specification." *Id.* at 5a-6a. By remarkably construing the District Court's definition as consistent with ordinary meaning, the Federal Circuit sidestepped existing precedent requiring a clear disavowal in order to read a claim term contrary to its ordinary meaning.

The Federal Circuit's discussion of the '300 patent confirmed its view that *Phillips* had substantially relaxed the requirement of interpreting a claim according to its ordinary meaning absent a clear disavowal. Instead of first determining the ordinary meaning of "secured," the Federal Circuit immediately began identifying portions of the specification to support a disclaimer of conventionally soled shoes, without acknowledging contrary evidence presented by Akeva. Pet. App. 7a. The Federal Circuit relied heavily on *SciMed Life Systems, Inc. v. Advanced Cardiovascular Systems, Inc.*, 242 F.3d 1337, 1341 (Fed. Cir. 2001), which had found a disavowal of a claim term's ordinary meaning based on "all embodiments" language similar to a portion of the '300 patent specification.[8] Pet. App. 7a-8a. Yet the Federal Circuit conceded that, unlike the patent in *SciMed*, there could be no unequivocal disclaimer here, because the

[8] In the context of describing the detachable/rotatable rear sole of the *preferred embodiment* – not the flexible member that is the subject of the claims at issue in this lawsuit – the '300 patent stated that "[i]n all embodiments, the invention includes mechanical means for selectively locking the rear sole relative to the rear sole support and the upper of the shoe." Patent. App. 34a.

'300 patent specification expressly stated the patent's applicability to "permanently attached" soles – a term that, at least "at first blush," covers conventionally soled shoes. *Id.* at 8a.[9] Rather than reach the obvious conclusion of no disclaimer under *SciMed*, however, the Federal Circuit, citing *Phillips*, searched for a way to read the "permanently attached" language to exclude conventionally soled shoes. Like the District Court, the Federal Circuit concluded that the "'permanently attached' language in the specification contemplates shoes with heels that are permanently fixed (cannot be interchanged) but are rotatable." *Id.*

Although the Federal Circuit failed to address most of Akeva's evidence, it expressly refused to consider Akeva's '126 patent, an ancestor of the '300 patent. Pet. App. 9a. That patent demonstrated that Akeva used specific language – not "secured" or "permanently attached" – to claim a rotatably positionable sole. The Federal Circuit ruled that this evidence was categorically barred because the '126 patent "has a different disclosure than the '300 patent," *id.*, regardless of the materiality of any difference.[10]

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[9] The Federal Circuit's opinion twice states that the "disclaimer" here is "less equivocal" than in *SciMed*, Pet. App. 7a-8a, but context makes clear that the Court's word choice was erroneous. The Federal Circuit's discussion of *SciMed* centers on conflicting language in the '300 specification not present in *SciMed*, making the disclaimer in this case *more* equivocal than *SciMed* or *less* unequivocal than *SciMed*, but plainly not *less* equivocal.

[10] Akeva also cited its '210 patent, a grandparent of the '471 patent with an *identical* specification, to show that its claims distinguish between "detachably secured" and "secured." Pet. App. 17a. The Court simply ignored this point, which undermines its putative "same specification" rationale for not considering the '126 patent.

REASONS FOR GRANTING THE PETITION

I. CERTIORARI SHOULD BE GRANTED TO REMEDY THE FEDERAL CIRCUIT'S CONTINUED FAILURE TO SET FORTH AN INTELLIGIBLE STANDARD FOR DISCERNING WHEN PATENT CLAIMS MAY BE READ CONTRARY TO THEIR ORDINARY MEANING.

1. Pursuant to federal statute and longstanding practice, a patent has two key components, the claims and the specification. 35 U.S.C. § 112; *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 373 (1996). As this Court has long recognized, the claims set forth the scope of the inventor's legally protected creation. *See, e.g., General Elec. Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 369 (1938) (claims "measure the invention") (quoting *Continental Paper Bag Co. v. E. Paper Bag Co.*, 210 U.S. 405, 419 (1908)). In contrast, the specification enables a person of ordinary skill in the art to implement the invention, including, at a minimum, its preferred embodiment, thereby giving the public a "meaningful disclosure in exchange for being excluded from practicing the invention for a limited period of time." *University of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 922 (Fed. Cir. 2004) (citation omitted).

Because of the centrality of claim language, this Court has repeatedly cautioned against importing limitations from the specification into claims. *See, e.g., General Elec. Co.*, 304 U.S. at 374 (cautioning against "improper importation into the claim of a factor nowhere described therein"); *McCarty v. Lehigh Valley Pub. R.R. Co.*, 160 U.S. 110, 116 (1895) ("if we once begin to include elements not mentioned

in a claim . . . we should never know where to stop"); *White v. Dunbar*, 119 U.S. 47, 51-52 (1886).[11]

However, the Court also has recognized a competing principle – the specification's ability to inform the claim construction analysis. *See, e.g.*, *United States v. Adams*, 383 U.S. 39, 48-49 (1966) ("[I]t is fundamental that claims are to be construed in the light of the specifications and both are to be read with a view to ascertaining the invention." (citations omitted)); *Howe Machine v. National Needle*, 34 U.S. 388, 394 (1890) ("[T]he specification and drawings are usually looked at only for the purpose of better understanding the meaning of the claim, and certainly not for the purpose of changing it and making it different from what it is.").

This Court's most recent claim construction case, *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 389 (1996), alluded to the tension between these two principles in ruling that claim construction is a question for the court, not a jury. The Court recognized that "[t]he claim 'define[s] the scope of a patent grant,'" *id.* at 373 (citation omitted), but also that a claim "term can be defined only in a way that comports with the instrument as a whole," *id.* at 380. The Court concluded that claim construction is best resolved by the Federal Circuit – the "exclusive appellate court for patent

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[11] Claims ensure that "'the limits of a patent [are] known for the protection of the patentee, the encouragement of the inventive genius of others and the assurance that the subject of a patent will be dedicated ultimately to the public.'" *Markman*, 517 U.S. at 390 (quoting *General Elec. Co.*, 304 U.S. at 369). As this Court has explained, the centrality of claim language "reliev[es] the courts from the duty of ascertaining the exact invention of the patentee by inference and conjecture." *Keystone Bridge Co. v. Phoenix Iron Co.*, 95 U.S. 274, 278 (1877).

cases," *id.* at 390; *see* 28 U.S.C. § 1295(a) – rather than by juries, because of the need for uniformity and predictability.

Thus, this Court has recognized, but has not yet resolved, the tension between two fundamental canons of patent law – that a claim is to be understood in light of the specification, but that the specification may not itself limit the claim. To date, that task has been left to the Federal Circuit.

2. Simply put, the Federal Circuit has not been up to the task. As recently observed by one Federal Circuit judge:

> The problem is that our decisions provide inadequate guidance as to when it is appropriate to look to the specification to narrow the claim by interpretation and when it is not appropriate to do so. Until we provide better guidance, I fear that the lower courts and litigants will remain confused.

SciMed, 242 F.3d at 1347 (Dyk, J., concurring).

It is not that the Federal Circuit is ignorant of the significance of the competing principles at issue or of the need for an intelligible framework to patrol the line between them. Indeed, the Federal Circuit has repeatedly recognized the "fine line between reading a claim in light of the specification, and reading a limitation into the claim from the specification." *Comark*, 156 F.3d at 1186-87; *see, e.g.*, *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1117 (Fed. Cir. 2004) (discussing the "longstanding difficulty in the contrasting nature of the axioms"). Moreover, the Federal Circuit has recognized the need to provide more guidance than mere invocation and repetition of these "twin axioms," because the "axioms themselves seldom provide an answer, but instead merely

frame the question to be resolved." *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 904 (Fed. Cir. 2004).

Despite recognizing the need for a uniform, intelligible claim construction jurisprudence, the Federal Circuit became polarized after *Markman*. After setting forth basic principles in *Vitronics Corp. v. Conceptronic Inc.*, 90 F.3d 1576 (Fed. Cir. 1996), "decisions of the Federal Circuit increasingly diverged . . . into two more or less opposing camps." R. CARL MOY, MOY'S WALKER ON PATENTS § 4:35 (2006). One camp "espoused a more formal, rule-based approach to claim interpretation that focused mainly on the language of the patent claim," whereas "the other camp, in contrast, approached the question more globally and with less dedication to any particular procedure." *Id.* This divide deepened substantially in 2002, when a Federal Circuit panel determined that dictionary definitions – not simply the claim language itself – should be the touchstone for claim interpretation. *Texas Digital Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193 (Fed. Cir. 2002); *see, e.g.*, MOY, *supra*, § 4:38 (explaining that the "distinction between these two camps has only sharpened over time," upon "statements giving heavy weight to the definitions set forth in published dictionaries"); DONALD S. CHISUM, CHISUM ON PATENTS § 18.03[1][d] (2007 Supp.) (noting the jurisprudential shifts "provoked by a 2002 panel decision that emphasized dictionary definitions of disputed claim terms").

Before *Phillips*, however, at least two principles appeared to have been settled. *First*, the claim construction analysis should begin by attempting to ascertain the ordinary meaning of the claim language. *See, e.g.*, *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1324 (Fed. Cir. 2002) ("We begin our claim construction analysis, as always, with the words of the claim."); *Hockerson-Halberstadt, Inc. v.*

Avia Group Int'l, 222 F.3d 951, 955 (Fed. Cir. 2000) (as "a starting point, the court gives claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art"). Thus, despite the emerging dispute within the Federal Circuit concerning whether dictionaries should supply the ordinary meaning, there was a consensus that the claim language provided the starting point for claim construction. *See, e.g.*, ROBERT L. HARMON, PATENTS AND THE FEDERAL CIRCUIT 33 (6th ed. 2004 Supp.) (discussing the "apparent emergence of a standard protocol for claim construction," pursuant to which "the analytical focus must begin with and remain centered on the language of the claims," and the specification should not be consulted "before any effort is made to discern the ordinary and customary meanings attributed to the words themselves").

Second, a "heavy presumption" was held to attach to the claim term's ordinary meaning, assuming the existence of such a meaning. *Teleflex*, 299 F.3d at 1325; *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002); *Johnson Worldwide Assoc., Inc. v. Zebco Corp.*, 175 F.3d 985, 988 (Fed. Cir. 1999); HARMON, *supra*, at 34. Rebutting that heavy presumption required "expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope." *Teleflex*, 299 F.3d at 1325; *see e.g., Liebel-Flarshaim*, 358 F.3d at 906; *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir. 2003); *SciMed*, 242 F.3d at 1344. Thus, there was no disclaimer of ordinary meaning if "the alleged disavowal of claim scope is ambiguous." *Omega*, 334 F.3d at 1324.

3. In 2004, the Federal Circuit granted en banc review in *Phillips*, articulating seven questions for consideration and providing hope of enhanced clarity in claim construction. *Phillips v. AWH Corp.*, 376 F.3d 1382 (Fed. Cir. 2004)

(granting en banc review); *see, e.g.*, Holly L. Bonar, *Is Something Amiss? A Commentary on the Aftermath of* Phillips v. AWH Corp., 88 J. Pat. & Trademark Off. Soc'y 513, 518 (2006) ("As a result of the obvious disagreement over the proper method to interpret claim terms by members of the Federal Circuit, many observers anxiously awaited claim construction guidance from *Phillips* that might yield some certainty."); Crissa A. Cook, *Comment: Constructive Criticism:* Phillips v. AWH Corp. *and the Continuing Ambiguity of Patent Claim Construction Principles*, 55 Kan. L. Rev. 225 (2006) (discussing the optimism that *Phillips* would "alleviate the instability and uncertainly plaguing the federal appellate process for claim construction appeals").

At first blush, *Phillips* appeared ready to tackle what it considered "[t]he principal question": "the extent to which we should resort to and rely on a patent's specifieation in seeking to ascertain the proper scope of its claims." 415 F.3d at 1312. However, *Phillips* offered no new intelligible principle to resolve this question. To the contrary, it simply summarized and "reaffirm[ed]" the conflicting principles of claim construction it had previously articulated in a wide variety of cases. *Id.* at 1312 (stating that "the basic principles of claim construction outlined" in *Markman*, *Vitronics*, and *Innova* "are still applicable, and we reaffirm them today"). Tellingly, despite the sharp differences among the Federal Circuit judges pre-*Phillips*, nearly all of the judges concurred with this articulation of basic claim construction principles, calling into doubt whether that exposition provided a meaningful legal framework.

Worse still, *Phillips* cast doubt on two principles of claim construction that *had* emerged – the "heavy presumption" of ordinary meaning and the "clear disavowal" standard for rebutting ordinary meaning. The Court at first appeared to

reaffirm the presumption of ordinary meaning, absent "an intentional disclaimer or disavowal of claim scope." 415 F.3d at 1316 (citing *CCS Fitness* and *SciMed*). Yet, in rejecting over-reliance on dictionary definitions, *Phillips* criticized the "ordinary meaning" jurisprudence more broadly. Specifically, *Phillips* rejected the "*Texas Digital* approach" of using the ordinary meaning unless "the specification contains a sufficiently specific alternative definition or disavowal," because that approach "improperly restricts the role of the specification." *Id.* at 1320.

Thus, *Phillips* appeared to undermine the requirement of a clear disavowal to restrict the ordinary meaning of a claim term. Although the Court "recogniz[ed] that the distinction between using the specification to interpret the meaning of a claim and importing limitations from the specification into the claim can be a difficult one to apply in practice," the only guidance offered in *Phillips* is no guidance at all. 415 F.3d at 1323. The Court merely expressed hope that "the line between construing terms and importing limitations can be discerned with reasonable certainty and predictability if the court's focus remains on understanding how a person of ordinary skill in the art would understand the claim terms." *Id.* According to the Court, despite the "difficulties" of such freeform analysis, "resolv[ing] that problem in the context of the particular patent is likely to capture the scope of the actual invention" most accurately. *Id.* at 1323-24.

Adding further to the confusion is the result in *Phillips*, which *adopted* the ordinary meaning of a disputed term – "baffles" – 415 F.3d at 1324-38, despite criticizing reliance on ordinary meaning. *See* David Sanker, *Note:* Phillips v. AWH Corp.*:* *No Miracles in Claim Construction*, 21 Berkeley Tech. L.J. 101, 114 (2006) (*Phillips* "did not follow its own guidelines to determine the meaning of the term

'baffles'"). *Phillips* concluded that the term "should not be read restrictively to require that the baffles in each case serve all of the recited functions" in the specification. 415 F.3d at 1326-27 (citing *Liebel-Flarsheim*, 358 F.3d at 908).[12]

Had the panel in this case followed *Phillips*' claim construction analysis, as opposed to *Phillips*' general legal discussion, the ordinary meaning of "secured" would have controlled. Specifically, the Federal Circuit should not have required (as it did) every shoe covered by the patents to serve *both* primary functions disclosed in the specifications – extending shoe life (via a detachable/rotatable rear shoe sole) and enhancing spring (via a flexible member). *Cf.* Pet. App. 8a. Yet the internally inconsistent principles articulated in *Phillips* allowed the Court to do just that.

Not surprisingly, *Phillips* has been interpreted – including by the Federal Circuit here – to relax the heavy presumption previously accorded the ordinary meaning of claim terms. Pet. App. 4a. Other Federal Circuit panels and district courts have reached the opposite conclusion and continue to require a clear disavowal of ordinary meaning.[13]

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[12] It is settled that patentees are "not required to include within each of their claims all . . . advantages or features described as significant or important in the written description." *Golight, Inc. v. Wal-Mart Stores, Inc.*, 355 F.3d 1327, 1331 (Fed. Cir. 2004).

[13] Numerous post-*Phillips* decisions reflect competing views of the status of the "heavy presumption"/"clear disavowal" framework. *See, e.g.*, *Andersen Corp. v. Fiber Composites, LLC*, 474 F.3d 1361, 1372 (Fed. Cir. 2007) (finding a clear disavowal of ordinary meaning but noting the "tightrope" walking required after *Phillips*); *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 469 F.3d 1039, 1041 (Fed. Cir. 2006) (Newman, J., dissenting from denial of en banc rehearing) (chiding the panel majority for adopting the ordinary meaning of a claim term after *Phillips*); *Honeywell Int'l,*

As commentators have noted, *Phillips* did not bring clarity to claim construction, but rather provided a kitchen sink of principles that can be used to justify any desired outcome. *See, e.g.*, CHISUM, *supra*, § 18.03[1][d] (questioning "whether *Phillips* will influence the result in particular cases involving claim construction"); MOY, *supra*, §§ 4.39, 4.40 (explaining the "murky nature of the en banc decision"); Bonar, *supra*, at 513 ("After *Phillips*, claim construction jurisprudence remains in disarray as the Federal Circuit appears to be applying different parts of its *Phillips* ruling in different cases."); Cook, supra, at 253. Two dissenters in *Phillips* anticipated this precise situation. *See Phillips*, 415 F.3d at 1330 (Mayer, J., dissenting) ("we say nothing new, but merely restate what has become the practice over the last ten years – that we will decide cases according to whatever mode or method results in the outcome we desire, or at least allows us a seemingly plausible way out of the case").

4. Clarification of the fundamentally important issue of patent law presented by this case is possible. Indeed, prior to *Phillips*' about-face, the Federal Circuit was progressing with a framework of presumptive ordinary meaning and

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Inc. v. ITT Indus., 452 F.3d 1312, 1318-20 (Fed. Cir. 2006) (applying a relaxed disavowal standard in light of *Phillips*' emphasis on the specification); *nCube Corp. v. Seachange Int'l, Inc.*, 436 F.3d 1317, 1321-22 (Fed. Cir. 2006) (refusing to limit the ordinary meaning of claim language, over Judge Dyk's *Phillips*-based dissent); *Nystrom v. Trex Co., Inc.*, 424 F.3d 1136, 1144 (Fed. Cir. 2005) (adopting a limited claim construction after *Phillips*, and not requiring a clear disavowal of ordinary meaning); *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1308-09 (Fed. Cir. 2005) (applying the "clear disavowal" standard in refusing to limit the claim construction in light of *Phillips*).

clear disavowal.[14] The problem is that the Federal Circuit has proved incapable of adhering to a framework for when claims may be read contrary to their ordinary meaning. Instead, the Court continues to issue unpredictable decisions and to apply ever-changing and conflicting frameworks, leaving inventors, litigants and lower courts in a state of palpable and debilitating confusion. Absent an intelligible framework for navigating the "fine line" between claim and specification, that line is disintegrating. This Court's intervention is necessary.

This case presents an ideal vehicle for resolving the question presented. *First*, the Federal Circuit's approach to claim construction – namely, ignoring the ordinary meaning and any support for it, and combing the patent specification for a basis for limiting the claims – was determinative. Had the Federal Circuit applied a heavy presumption of ordinary meaning and required a clear disavowal, it would have been required to apply the ordinary meaning of "secured." As the Federal Circuit conceded, the specification was equivocal with respect to the meaning of "secured," Pet. App. 7a-8a, and thus could not provide a clear disavowal of the term's ordinary meaning.[15] *Second*, the decision below is incorrect.

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[14] As this Court has observed, such an about-face unfairly upsets the settled expectations of inventors such as Petitioner. *See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 731-32 (2002) ("courts must be cautious before adopting changes that disrupt the settled expectations of the inventing community").

[15] Akeva presented abundant evidence supporting the ordinary meaning of "secured" and demonstrating no clear disavowal of conventionally soled shoes, including: (1) the "permanently attached" language in the '300 patent specification; (2) the use of "secured" consistent with its ordinary meaning throughout the '300 and '471 patent specifications; (3) the prior claiming of

The panel's unprincipled approach plainly conflicts with the presumptive ordinary meaning and "clear disavowal" framework that was widely accepted before *Phillips* and that *Phillips* actually employed on its facts. As this Court has recognized in the context of other patent doctrines, an analysis based on presumptions is often the best way to balance the at-times competing goals of certainty and promoting innovation. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 731-32 (2002).

The unprincipled nature of the decision below perhaps becomes most vivid when the Federal Circuit's actual claim constructions are considered. The Federal Circuit concluded that a commonly understood word – "secured" – should be given two counter-intuitive, conflicting meanings – one for the '300 patent and one for the similar '471 patent.[16] In irreconcilable contrast, the Federal Circuit remarked that the term that had been most hotly disputed by the parties below – "flexible member" – was an "inclusive term" to be read according to its ordinary meaning. Pet. App. 2a. Moreover, the Federal Circuit reached its conclusions despite clear evidence from the prosecution history that "secured" simply

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detachable/rotatable soles by ancestors of the '300 and '471 patents, and the differentiation in the claims of those ancestral patents among "secured," "detachably secured," and "rotatably positionable"; (4) the patent examiner's remark that she had always interpreted "secured" to mean "fastened" or "attached"; and (5) the fact that there was only one passing reference in the '300 patent specification to rotatable, non-removable soles, located columns away from the "permanently attached" language. The Federal Circuit's approach rendered this evidence irrelevant.

[16] For the '471 patent, "secured" means "detachably secured," whereas for the '300 patent, "secured" means "secured to the shoe, but not permanently fixed." Pet. App. 5a, 9a.

had its ordinary meaning of "fastened" or "attached." *See infra* Section III. Simply put, claim construction should not be an exercise in cherry-picking portions of the specification to support a court's visceral reaction that conflicts with the plain meaning of the claims. Other doctrines exist – such as invalidity – to rein in overbroad patent claims.

5. This Court has not yet addressed the Federal Circuit's perennially inconsistent approach to the relationship between the ordinary meaning of a claim and the specification. Caution may have been warranted prior to *Phillips*, which held the promise of bringing some clarity. But, as explained, *Phillips* has done nothing but make matters worse. *See, e.g.*, Sanker, *supra*, at 121-22 (after *Phillips*, it "would be a miracle" for the Federal Circuit to "resolve the riddle of 'construing the claims in light of the specification without importing limitations from the specification'").

Moreover, *Phillips* is merely one in a long line of the Federal Circuit's illusory promises of clarity. For example, the United States, in opposing certiorari in *Alloc, Inc. v. United States Int'l Trade Comm'n*, 342 F.3d 1361 (Fed. Cir. 2003), assumed the validity of concerns like those raised here, but claimed that any confusion would be alleviated by *Teleflex, Inc. v. Ficosa North America Corp.*, 299 F.3d 1313 (Fed. Cir 2002), which supposedly "articulated a clear standard for determining when a claim term should be limited based on the specification and prosecution history." U.S. Opp., *Alloc, Inc. v. United States Int'l Trade Comm'n*, No. 03-1187, at 10-11 (2004). But the "clear standard" attributed to *Teleflex* is the precise "ordinary meaning" and "clear disavowal" framework that, only two years later, was rendered obsolete by *Phillips*. *See id.* The Court should not allow the theoretical possibility of eventual clarity from the Federal Circuit to thwart its review of a fundamental,

important and recurring question of patent law. Immediate review by this Court is warranted. *See* S. Ct. R. 10(c).[17]

II. THIS COURT'S INTERVENTION IS NEEDED TO ENSURE THAT THE FEDERAL CIRCUIT ACTUALLY CONDUCTS THE CRITICAL DE NOVO CLAIM CONSTRUCTION ANALYSIS THAT IT PURPORTS TO REQUIRE.

1. Since *Cybor Corp. v. FAS Technologies, Inc.*, 138 F.3d 1448, 1456 (Fed. Cir. 1998), the Federal Circuit has purported to apply de novo review to all aspects of a district court's claim construction. The Federal Circuit based that holding on *Markman*, explaining that the "Supreme Court endorsed this court's role in providing national uniformity to the construction of a patent claim," and that such "a role . . . would be impeded if we were bound to give deference to a trial judge's asserted factual determinations incident to claim construction." *Id.* at 1455.

Cybor has been hotly debated since its inception. Although it has had several opportunities to revisit *Cybor* – most recently, in *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 457 F.3d 1293, *reh'g denied*, 469 F.3d 1039 (Fed. Cir. 2006), *pet. for cert. filed*, No. 06-1291 (March 22, 2007) – the Federal Circuit has refused, generating impassioned intracircuit debate. For instance, six separate opinions in *Amgen* reacted to the refusal to rehear the decision en banc.[18]

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[17] Notably, the petition for certiorari denied in *Phillips* (No. 05-602) did not present a substantive claim construction issue, but only raised the suitability of the de novo standard of review – an issue not reached by the *Phillips* majority.

[18] The *Amgen* petition for a writ of certiorari properly presents the de novo review question, but without the substantive claim

2. Vociferous cries for revision of *Cybor* are not its only opposition. In practice, *Cybor* has been eroded by Federal Circuit panels that do not engage in an actual de novo claim construction. Some Federal Circuit panels have expressly refused to apply *Cybor* strictly. *See, e.g.*, William H. Burgess, *Comment: Simplicity at the Cost of Clarity: Appellate Review of Claim Construction and the Failed Promise of Cybor*, 153 U. Pa. L. Rev. 763, 786-87 (2004) (explaining that "some federal judges have been reluctant to apply [*Cybor*] strictly"). These panels have grounded their view in the concurrences in *Cybor*, which stated that certain, unspecified aspects of a district court's claim construction ruling "should be accorded significant weight." *Cybor*, 138 F.3d at 1463 (Bryson, J., concurring); *see, e.g.*, *Key Pharms. v. Hercon Labs. Corp.*, 161 F.3d 696, 713 (Fed. Cir. 1998).

Other Federal Circuit panels have similarly undermined *Cybor*, but with less pomp. Rather than conduct an actual de novo review, these panels determine if "the record supports the district court's interpretation." *LNP Eng'g Plastics v. Miller Waste Mills*, 275 F.3d 1347, 1356 (Fed. Cir. 2001); *see, e.g.*, *Utah Med. Prods. v. Graphic Controls*, 350 F.3d 1376, 1382-83 (Fed. Cir. 2003); *Minnesota Mining and Mfg. Co. v. Chemque, Inc.*, 303 F.3d 1294, 1304 (Fed. Cir. 2002).

In this case, the Federal Circuit, though purporting to apply the de novo standard, Pet. App. 2a, applied a relaxed

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construction issues presented here. Review of this case is warranted regardless of whether certiorari is granted in *Amgen*. However, this case would provide an extremely suitable companion to *Amgen*. Together, these two petitions present the aspects of the Federal Circuit's claim construction jurisprudence in most pressing need of review. At the very least, this case should be held for consideration pending resolution of *Amgen*.

standard of review akin to the cases noted above. The panel merely considered whether the evidence cited by the District Court "supports" the conclusions it had reached, Pet. App. 8a, ultimately determining that there was no basis for "disturb[ing] the district court's claim construction," *id.* at 6a. Thus, rather than methodically consider the claim language, the specification, the prosecution history, and other relevant sources, the Federal Circuit merely identified evidence in support of the District Court's claim constructions, to which the Federal Circuit deferred. In so doing, the Federal Circuit ignored conflicting evidence presented by Akeva (including evidence ignored by the District Court) and blinded itself to the prosecution history, including ancestral patents showing that "secured" was not synonymous with detachable or rotatable. *See supra* n.15.[19]

3. This Court's intervention is necessary to ensure, as the Federal Circuit has not, that the Federal Circuit actually employs the de novo standard mandated by *Cybor*. At present, litigants cannot be sure what standard of review actually applies until they receive the Federal Circuit's

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[19] A proper de novo analysis also requires consideration of relevant intrinsic evidence not in the District Court record. The Federal Circuit further erred and split from other authority by refusing to take judicial notice of highly probative portions of the prosecution history – namely, additional ancestral patents not part of the District Court record – which showed that Akeva's patent claims regularly use "secured" pursuant to its ordinary meaning. *Compare* Order of April 4, 2006 (denying Akeva's request for judicial notice), *with*, Fed. R. Evid. 201(d) ("A court *shall* take judicial notice if requested by a party and supplied with the necessary information." (emphasis added)); *Hoganas AB v. Dresser Indus., Inc.*, 9 F.3d 948, 954 n.27 (Fed Cir. 1993) (taking judicial notice of a patent "not part of the record on appeal").

opinion. This issue is of obvious importance, as it affects all claim construction appeals. And there is an acute interest in "providing national uniformity to the construction of a patent claim." *Cybor*, 138 F.3d at 1455 (citing *Markman*, 517 U.S. at 390). Absent de novo review, litigants lack a meaningful appeal to the court uniquely suited to adjudicate claim construction. *See Markman*, 517 U.S. at 390. Working back from a district court's conclusions to locate the best evidence in support of a reviewing court's visceral reaction – as in this case – is inconsistent with de novo review and its rationales of fairness, correctness and uniformity.

This case provides an excellent vehicle for resolving the question presented. Had the Federal Circuit conducted a proper analysis – starting from the words of the claim rather than from the District Court's conclusions – "secured" would have received its ordinary meaning.[20]

III. THIS COURT SHOULD RECTIFY THE FEDERAL CIRCUIT'S REFUSAL TO CONSIDER HIGHLY PROBATIVE ANCESTRAL PATENTS.

This Court's review is urgently needed to ensure that courts actually do consider all relevant intrinsic evidence, as *Phillips* purports to require. The decision below deepens confusion concerning when ancestral patents may be used to illuminate the meaning of claims in the patent at issue.

The Federal Circuit refused to consider highly probative ancestral patents in the record, which showed that Akeva has carefully distinguished between claiming, on one hand, the

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[20] Even if aspects of certain lower court decisions may deserve deference – *e.g.*, those involving highly technical matters or oral testimony, *cf. Amgen Inc.*, No. 06-1291 – the basic interpretation of patent text at issue here does not deserve deference.

broad class of shoes with "secured" soles and, on the other hand, the narrower classes of shoes with "detachably secured" or "selectively rotatable" soles. Pet. App. 9a. Such differential claiming "provides strong support" for reading "secured" pursuant to its ordinary meaning. *Liebel-Flarsheim*, 358 F.3d at 910; *see, e.g.*, *Comark*, 156 F.3d at 1187 ("There is presumed to be a difference in meaning and scope when different words or phrases are used in separate claims." (citation omitted)).

The panel's decision to ignore this critical prosecution history places it within a split of authority. The panel cited *Microsoft Corp. v. Multi-Tech Sys., Inc.*, 357 F.3d 1340 (Fed. Cir. 2004), for the claim that related patents may only be considered if they have the same specification. Pet. App. 9a.[21] But whether the specifications were identical was not dispositive in *Microsoft*, which held that "the prosecution history of one patent is relevant to an understanding of the scope of a common term in a second patent stemming from the same parent application." *Id.* at 1349-50 (citing *Jonsson v. Stanley Works*, 903 F.2d 812, 818 (Fed. Cir. 1990)).

Other Federal Circuit cases similarly conflict with the decision below by making clear that the determinative factor is family relationship, not identity of specification. *See, e.g.*, *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1289 (Fed. Cir. 2005) ("Because [the] patents all derive from the same parent application and share many common terms, we must interpret the claims consistently across all asserted

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[21] The Court applied this reasoning to the '126 patent, an ancestor of the '300 patent with a materially similar specification. The Court simply did not address the '210 patent – an ancestor to the '471 patent with an *identical* specification – despite that its reading of *Microsoft* required it to consider the '210 patent.

patents."); *Goldenberg v. Cytogen*, 373 F.3d 1158, 1167 (Fed. Cir. 2004) (the Federal Circuit "draws a distinct line between patents that have a familial relationship and those that do not").

Not only is this issue the subject of a Federal Circuit divide, but it is also important and recurring. And it is critical to the outcome of this case. Had the Federal Circuit consulted the '126 and '210 patents (ancestors of the '300 and '471 patents, respectively), it would have been crystal clear that Akeva distinguishes in claiming "secured," "detachably secured," and "rotatably positionable" rear soles. Consideration of these patents would have made it impossible for the Federal Circuit to maintain its strained readings of "secured" in the patents at issue here. There is no basis for the Federal Circuit's refusal to consider highly probative ancestor patents. Without instruction from this Court, however, that practice is certain to continue.

CONCLUSION

The petition for a writ of certiorari should be granted.

Respectfully submitted,

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APPENDIX

Appendix A

Note: Pursuant to Fed. Cir. R. 47.6, this disposition is not citable as precedent. It is a public record.

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

06-1090

AKEVA L.L.C.,
Plaintiff-Appellant,

v.

ADIDAS-SALOMON AG,
Defendant,

and

ADIDAS AMERICA, INC.,
Defendant-Appellee.

DECIDED: November 13, 2006

Before MICHEL, *Chief Judge*, PLAGER, *Senior Circuit Judge*, and RADER, *Circuit Judge*.

RADER, *Circuit Judge*.

Akeva L.L.C. (Akeva) is a company which has been assigned and licenses a portfolio of footwear patents. Akeva sued adidas America, Inc. (adidas) for infringement of

certain claims of two of its patents: U.S. Patent No. 6,662,471 (the '471 patent) and U.S. Patent No. 6,604,300 (the '300 patent).[1] These patents describe improvements to athletic shoe heels. According to Akeva, the specifications of the '300 and '471 patent describe a "flexible member"[2] improvement that can be incorporated in rear soles that are detachable, or rotatable, or permanently secured. The district court construed these patents as covering shoes with rotatable or detachable rear soles only. *See Akeva L.L.C. v. adidas Am., Inc.*, 1:03-CV-01207 (M.D.N.C. May 17, 2005) (*Claim Construction Decision*); *Akeva L.L.C. v. adidas Am., Inc.*, 385 F. Supp. 2d 559 (M.D.N.C. 2005) (*Reconsideration Decision*)[3]. Because adidas shoes have permanently-fixed rear soles that do not rotate, Akeva accepted entry of summary judgment of non-infringement and appealed the district court's claim construction to this court. *Akeva L.L.C. v. adidas Am., Inc.*, 1:03-CV-01207 (M.D.N.C. Oct. 28, 2005) (*Final Judgment*). Because the district court correctly construed the term "secured," the summary judgment of non-infringement is *affirmed.*

I

A district court's claim construction findings are reviewed de novo on appeal. *Cybor Corp. v. FAS Techs.*

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[1] Akeva asserted claims 93, 94, 100-106, 109, 117, 118, 121-154, 192-194, and 204-232 of the '300 patent, and claims 1-32 of the '471 patent against adidas.

[2] "Flexible member" is an inclusive term given to describe the U-shaped member of the '471 patent and the flexible plate of the '300 patent.

[3] The district court reconsidered its claim construction decision in light of this court's intervening decision in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), but did not deviate from its original construction.

Inc., 138 F.3d 1448, 1456 (Fed. Cir. 1998) (en banc). A grant of summary judgment is also reviewed de novo. *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc.*, 262 F.3d 1258, 1266-67 (Fed. Cir. 2001). This court has jurisdiction under 28 U.S.C. § 1295(a)(1).

The central issue of this appeal is the meaning of the term "secured" as it is used in the '300 and '471 patents. Claim 93 of the '300 patent, for example, claims:

> A shoe comprising:
>
> an upper having a heel region;
>
> a rear sole *secured* below the heel region of the upper; and
>
> a flexible plate having upper and lower surfaces and positioned between at least a portion of the heel region of the upper. . . .

'300 patent, col. 20 ll.29-43 (emphasis added).

The '471 patent also uses the term "secured." For example, claim 1 states:

> A shoe comprising:
>
> an upper, and
>
> a rear sole *secured* below a portion of the upper, the rear sole comprising:
>
> > a member having a top wall with a lower surface . . . the member having a bottom wall . . . the forward regions of the top and bottom walls being connected at a close end by a curved wall. . . .

'471 patent, col. 13 ll.6-50 (emphasis added).

Akeva argues that the ordinary meaning of the claim should be given to the term and that the ordinary meaning would encompass permanent, removable, and rotatable soles to athletic shoes. adidas argues that the specifications of the '300 and '471 patents disavow rear soles that are not detachable or rotatable.

This court construes claims in accordance with the principles set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). Claim language governs claim interpretation. *Id.* at 1312. Claim terms, however, are construed in light of the specification. *Id.* at 1315. The ordinary meaning of a term may be narrowed when interpreted in light of the specification. *Id.* at 1316.

A. The '471 Patent

The '471 patent is directed to athletic soles with interchangeable soles which "provide extended and more versatile life and better performance in terms of cushioning and spring." Col. 1 ll.13-17. The '471 patent states that "an athletic shoe can be changed dramatically if it is simply given interchangeable rear soles." *Id.* at col. 2 ll.54-55. In particular, the specification describes shoes with "interchangeable/detachable rear soles" to address problems with uneven wear patterns. *Id.* at ll.14-15, 26-27. While Akeva argues that the invention of the '471 patent is the flexible membrane, the language of the '471 specification specifically states that the invention of the '471 patent is an athletic shoe with a detachable heel: "However, in a radical departure from conventional shoes, the shoe of the present invention incorporates a heel structure, including *a detachable rear sole*, that significantly alleviates heel wear problems associated with conventional soles and provides enhanced cushioning and/or spring." *Id.* at col. 4 ll.56-61 (emphasis added).

Akeva argues that the catch-all phrase at the end of the '471 patent specification, which states "[t]hus, it is intended that the present invention cover all possible combinations of the features shown in the different embodiments, as well as modifications and variations of this invention, provided they come within the scope of the claims and their equivalents," precludes a claim construction which comprises only detachable heels. Col. 13 ll.1-5. No embodiments, however, of the '471 patent include permanently attached heels. Of course, the absence of an embodiment does not necessarily exclude that embodiment from the scope of the invention. *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004). But here, the specification when read as a whole clearly demonstrates that the scope of the invention is athletic shoes with detachable heels which may include an optional flexible plate. *See* '471 patent, col. 4 ll.62-col. 5 ll.4 ("An embodiment of the heel structure . . . includes . . . a rear sole detachable secured to the rear sole support. . . . In addition, the heel structure may include a flexible plate for providing spring to the heel of the user and reducing wear caused by midsole compression."). Akeva cites *Golight, Inc. v. Wal-Mart Stores, Inc.*, 355 F.3d 1327, 1331 (Fed. Cir. 2004), in which the court found no disclaimer where the specification states the invention "includes" some feature where it is only one of several features described as significant or important. However, this case is distinguishable because the detachable sole of the '471 patent is not one of several features, it is the primary feature of the invention.

Indeed, when the '471 patent uses the term "secured," it uses it to describe a rear sole which is "detachably secured." Col. 3 ll.14-17. Finding that the term "secured" applies only to shoes with detachable heels does not take the term outside its ordinary meaning. Rather, the term is interpreted as it is

used in accordance with the specification; "secured" does allow for removability. As this court has stated in *Phillips*, "[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." 415 F.3d at 1316. In other words, an inventor cannot get more than he or she invents. *On Demand Mach. Corp. v. Ingram Indus. Inc.*, 442 F.3d 1331, 1344 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1316 and *Autogiro Co. of Am. v. United States*, 384 F.2d 391, 397-98, 181 Ct. Cl. 55 (1967)) ("[while] each term standing alone can be construed as having varying degrees of breadth, each term must be construed to implement the invention described in the specification"). The district court construed this term as used in the '471 patent to mean "a rear sole detachably secured below a portion of the upper." *Claim Construction Decision* at 28. As such, this court will not disturb the district court's claim construction that the '471 patent covers shoes with detachable heels.

B. The '300 Patent

The '300 patent specification also discloses athletic shoes with extended life by improving the rear sole such that the rear sole is rotatable, detachable, or both. The '300 patent notes that the soles of prior art athletic shoes tend to wear out faster than the shoe itself. Col. 1 ll.2-42. Further, athletic shoe performance cushioning also tends to wear out faster than the shoe itself. *Id.* at ll. 44-46. In order to solve this problem, the '300 patent specification discloses shoes that can be rotated into different positions to allow for more even wear to the sole of the athletic shoe. Col. 6 ll.56-59. Or, in a preferred embodiment, the rear sole can be detached, allowing the athletic shoe owner to change the sole

depending on the cushioning and other features desired for a particular activity. Col. 4 ll.42-46.

The district court construed the term "secured" in the '300 patent to mean "selectively or permanently fastened, but not permanently-fixed into position." *Claim Construction Decision* at 25. Akeva argues on appeal that the invention of the '300 patent is a flexible plate that can be used in shoes with rotatable, detachable, or permanently fixed heels. To support its argument for this claim interpretation here, Akeva points to language in the '300 patent specification which states "[t]he flexible region also need not be used only in conjunction with a detachable rear sole, but can be used with permanently attached rear soles as well." Col. 10 ll.12-16. Akeva also argues that a related patent, U.S. Patent 5,560,126 (the '126 patent), claims a "detachably secured" rear sole and a rear sole that allows for "selective rotation" and that this supports its claim that such soles are not the claimed invention of the '300 patent. Thus, Akeva argues, the asserted claims of the '300 patent cover permanently-fixed soles that will or will not rotate and which contains a flexible plate.

In *SciMed Life Systems Inc. v. Advanced Cardiovascular Systems Inc.*, 242 F.3d 1337, 1341 (Fed. Cir. 2001), this court stated "[w]here the specification makes clear that the invention does not include a particular feature, that feature is deemed to be outside the reach of the claims of the patent, even though the language of the claims, read without reference to the specification, might be considered broad enough to encompass the feature in question." In *SciMed*, the language of the specification contained a "broad and unequivocal" disclaimer of dual lumens in catheters. 242 F.3d at 1344. The language of the '300 patent specification is less equivocal than that in *SciMed*. Here, the '300 patent

states contains the "all embodiments" language discussed in *SciMed*: "[i]n all embodiments, the invention includes mechanical means for selectively locking the rear sole relative to the rear sole support and upper of the shoe." Col 7 ll.17-20. The "all embodiments" language of the '300 patent specification however, appears at first blush to conflict with the "permanently attached rear soles" language, creating a less equivocal disclaimer than that of *SciMed*. Col. 7 ll.17-20; col. 10 ll.12-16.

Nevertheless, the "permanently attached" language, when read in the context of the specification, supports a finding that the '300 patent specification disclaims permanently attached rear soles that do not at least rotate. *Phillips*, 415 F.3d at 1316. The "permanently attached" language in the specification contemplates shoes with heels that are permanently fixed (cannot be interchanged) but are rotatable. For example, the '300 patent specification states that "the rear sole may not be removable but only rotatably positionable." Col. 7 ll.42-43, *see also* col 6:58-63, col. 7 ll.35-44; Fig. 3 of the '300 patent. In addition, the '300 patent specification discusses as a problem of prior art shoes with heels the shoe owner is "stuck" with. Col. 2 ll.2-3. In order to solve this problem and other problems, the '300 patent contemplates athletic shoes with rear soles that can be rotated or replaced. Col. 6 ll.33-45.

As the district court noted: "Akeva has cited no statement in the '300 Patent's specification, and this court has found none, that would contemplate a rear sole that is permanently locked into position.' *Claim Construction Decision* at 25. Accordingly, one skilled in the art reading the specification of the '300 patent specification would understand the term "secured" as used in the '300 patent to

mean shoes with rear soles that are secured to the shoe, but not permanently fixed.

Further, while this court has considered prosecution of earlier patents in the construction of claim terms used in later issued patents, *see Microsoft Corp. v. Multi-Tech Sys., Inc.*, 357 F.3d 1340, 1349-50 (Fed. Cir. 2004), in those cases, the patents had the same specification. Here, the '126 patent on which Akeva relies has a different disclosure than the '300 patent.

Therefore, this court construes the term "secured" in accordance with the district court.

II. Infringement

Akeva concedes that if the claims are construed to only cover detachable or rotatable heels, adidas does not infringe its claims. Thus, this court affirms the district court's entry of summary judgment of non-infringement in favor of adidas.

Appendix B

UNITED STATES DISTRICT COURT FOR THE MIDDLE DISTRICT OF NORTH CAROLINA

1:03CV01207

AKEVA L.L.C.,
Plaintiff,

v.

aDIDAS AMERICA, INC.,
Defendant.

MEMORANDUM OPINION and ORDER

OSTEEN, District Judge

In this patent infringement action relating to the technology of athletic shoes, the court now reconsiders its Memorandum Opinion and Order of May 17, 2005 (the "Claim Construction Order"), in light of the recent en banc opinion of the Federal Circuit Court of Appeals in *Phillips v. AWH Corporation*, 415 F.3d 1303 (Fed. Cir. 2005). The court also herein considers Plaintiff's Motion for Partial Reconsideration of the Court's Claim Construction Order and Memorandum in Support Thereof. For the reasons stated below, the court will reaffirm its prior ruling and will deny Plaintiff's motion.

I. BACKGROUND

On May 17, 2005, this court issued the Claim Construction Order that construed the disputed claim terms.

The Claim Construction Order construed all terms to have their plain and ordinary meaning, with one exception. The term "secured" in both United States Patent No. 6,604,300 ("'300 Patent") and United States Patent No. 6,662,471 ("'471 Patent") was held to have a meaning more restrictive than its plain and ordinary meaning. The court found language in the specifications of the '300 and '471 Patents that disavowed or disclaimed claim scope, limiting the definition of the word "secured."

Plaintiff now asks the court to reconsider its ruling and to construe the term "secured" in both patents according to its plain and ordinary meaning. In addition, the Federal Circuit has since issued an en banc opinion in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005), that clarifies several aspects of claim construction doctrine on which the court relied in its analysis, requiring that the court review its ruling. *See also Phillips v. AWH Corp.*, 376 F.3d 1382 (Fed. Cir. 2004) (order granting rehearing en banc). The parties have submitted briefs discussing the impact of *Phillips* on the court's claim construction ruling.

The court will first address *Phillips*, and then will address Plaintiff's motion.

II. *PHILLIPS V. AWH CORPORATION*

In relevant part, the Federal Circuit's discussion in *Phillips* clarifies the role of intrinsic and extrinsic evidence, especially dictionaries and the specification, in defining the scope of a patent's claims. In addition to reaffirming the principles established in *Markman v. Westview Instruments*, Inc., 52 F.3d 967 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370, 116 S. Ct. 1384 (1996), *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576 (Fed. Cir. 1996), and *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111 (Fed.

Cir. 2004), the court realigned its method of analysis to downplay the role of dictionaries. *Phillips v. AWH Corp.*, 415 F.3d 1303, Nos. 03-1269, 03-1286, slip op. at 7-8 (Fed. Cir. Jul. 12, 2005).[1]

The Federal Circuit reiterated that the claims define the patentee's property rights and should be at the center of any claim construction analysis. *Id.* at 12. Additionally, the court emphasized that the meaning of claim terms must be ascertained from the point of view of one skilled in the art. *Id.* at 9. A court should begin its claim construction analysis from the "objective baseline" of the ordinary and customary meaning that a person skilled in the art would understand a claim term to have. *Id.* A court should also assume that a person skilled in the art would read the claims "in the context of the entire patent, including the specification." *Id.* at 10.

The specification is a statutory requirement, and the law requires that it "contain a written description of the invention . . . in such full, clear, concise, and exact terms as to enable any person skilled in the art . . . to make and use the same." 35 U.S.C. § 112, ¶ 1. Thus, "the specification necessarily informs the proper construction of the claims." *Phillips*, Nos. 03-1269, 03-1286, slip op. at 15. It is "entirely appropriate," then, for a court to "rely heavily" on the written description when construing claim terms. *Id.* at 16.

The Federal Circuit points to two ways in which the specification may limit the scope of claim terms. First, the patentee may have directed a special definition for a claim term. *Id.* In this case, the patentee's lexicography will control the meaning of the term or terms. *Id.* Second, "the

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[1] The page numbers cited for *Phillips v. AWH Corp.* will refer to the pagination in the slip opinion.

specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor." *Id.* In this situation, the "inventor's intention, as expressed in the specification, is regarded as dispositive." *Id.* (citing *SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1343-44 (Fed. Cir. 2001)).

The *Phillips* opinion also reiterates that the prosecution history is a useful source of information regarding how the Patent and Trademark Office and the inventor understood the invention. *Id.* at 17. In addition to reviewing the specification, a court may look to whatever portions of the prosecution history are in evidence. *Id.* This information is often less useful, however, because it tends to be less clear than the specification or even ambiguous. *Id.* To the extent it shows the inventor's understanding and whether the inventor limited the scope of the patent during prosecution, it may be helpful. *Id.*

With regard to extrinsic evidence (i.e., evidence outside the patent and its prosecution history), the Federal Circuit again indicated that district courts should place limited emphasis on it. This type of evidence, including dictionaries, can be used to aid the court's understanding of the field of the invention and the underlying technology. *Id.* at 18. Dictionaries, in particular, may be used to "assist the court in determining the meaning of particular terminology to those of skill in the art of the invention." *Id.* at 19. In general, however, extrinsic evidence is less reliable than intrinsic evidence and should be used only "in the context of the intrinsic evidence." *Id.* at 21. Because extrinsic evidence is not part of the patent and was not produced "for the purpose of explaining the patent's scope and meaning," it may have been created for a different audience, have the potential for bias, be misleading, and pose the risk of

contradicting or undermining the public record of the patent. *Id.* at 20.

Generally, the specification and prosecution history should take precedence over dictionaries. In *Texas Digital Systems, Inc. v. Telegenix, Inc.*, the Federal Circuit previously described dictionaries and similar technical sources as "particularly useful resources" for courts in determining the ordinary meaning of a claim term, and recommended consulting a dictionary as the first step in claim construction – before consulting the written description or prosecution history. 308 F.3d 1193, 1202 (Fed. Cir. 2002). In *Phillips*, the court explained that the methodology it set out in *Texas Digital* was focused on helping courts avoid "one of the cardinal sins of patent law – reading a limitation from the written description into the claims." *Phillips*, Nos. 03-1269, 03-1286, slip op. at 22 (quoting *SciMed*, 242 F.3d at 1340). The result, however, "improperly restrict[ed] the role of the specification in claim construction." *Id.* at 24. To avoid focusing the inquiry on the abstract definition of words from a dictionary, the *Phillips* court encouraged more focus on the claim terms in the context of the specification. *Id.* at 25. "Properly viewed, the 'ordinary meaning' of a claim term is its meaning to the ordinary artisan after reading the entire patent." *Id.*

The *Phillips* opinion noted that the duty of the patentee was to understand and describe his invention. Dictionary definitions are supposed to be broad and expansive, but a patent applicant must be more precise. *Id.* at 26. Because the patentee did not create the dictionary for the purpose of describing the invention, there could be a conflict between "the patentee's responsibility to describe and claim his invention[] and the dictionary editors' objective of aggregating all possible definitions for particular words." *Id.*

at 25. The court showed concern that the use of broad dictionary definitions as the first step in claim construction had led to "unduly expansive" constructions of claim terms, extending patent protection "beyond what should properly be afforded by the inventor's patent." *Id.* at 26. This "risk of systematic overbreadth" could be substantially corrected if the analysis began, instead, with the claims, specification, and prosecution history. *Id.*

While the Federal Circuit discussed various weaknesses of dictionaries and technical treatises in construing patent claims, it also made clear that these sources "are often useful to assist in understanding the commonly understood meaning of words and have been used both by our court and the Supreme Court in claim interpretation." *Id.* at 28. They have the advantage of being unbiased and accessible to the public prior to litigation. *Id.*

Finally, the opinion cautions that courts should watch the often difficult line between construing the terms in light of the specification and importing limitations from the specification. *Id.* Courts should keep their focus on "understanding how a person of ordinary skill in the art would understand the claim terms." *Id.* at 29.

In realigning its claim construction analysis, the Federal Circuit stated that "there is no magic formula or catechism." *Id.* at 30. "The sequence of steps used by the judge" will not matter so long as the court "attach[es] the appropriate weight to be assigned to those sources in light of the statutes and policies that inform patent law." *Id.* at 31.

Having summarized the relevant discussion from the *Phillips* opinion, the court now must reassess its prior ruling to determine whether the Federal Circuit's renewed focus on intrinsic evidence, especially on the terms and specification,

requires a fresh look at the disputed terms. The court will only reconsider its ruling as to claim terms that were disputed by the parties.

A. "Secured"

The most debated term at issue in this case is the term "secured" found in both the '300 and '471 Patents. This is the only claim term not given its plain and ordinary meaning because the court found language in the specifications of both patents evidencing a clear disavowal of claim scope. The court's construction of "secured" relied heavily on principles established in *SciMed Life Systems, Inc. v. Advanced Cardiovascular Systems, Inc.*, where the Federal Circuit held that when the specification clearly excludes a particular feature, "that feature is deemed to be outside the reach of the claims of the patent." 242 F.3d at 1341. This is true even if the claim language, on its own, could otherwise encompass that feature. *Id.*

The *Phillips* court reaffirmed *SciMed*, stating that an inventor's disclaimer or disavowal of claim scope is one way in which the specification may limit the meaning of claim terms. *Phillips*, Nos. 03-1269, 03-1286, slip op. at 16. Thus, the principle of disclaimer or disavowal on which this court relied in its Claim Construction Order remains alive. Further, the renewed emphasis on the specification, over and above the prosecution history, dictionaries, and other evidence, lends strong support to the notion that a disclaimer or disavowal found in the specification cannot be ignored in construing claim terms. The court sees no need to alter its construction of "secured" in light of *Phillips*.

Akeva argues in its *Phillips* brief that the court's ruling improperly limited the patent's scope to one or more embodiments described in the specification. (Pl.'s Mem.

Law Concerning Impact *Phillips v. AWH Corp.* Matter at 3-4.) However, Plaintiff mischaracterizes the nature of the court's ruling. The court did not find any implicit limitation of the term "secured" based on a lack of information about other possible forms, but rather found an explicit disavowal of a permanently positioned rear sole by express language in the '300 Patent and of a permanently attached rear sole by express language in the '471 Patent. (Mem. Op. & Order of May 17, 2005 at 25, 28.)

Plaintiff further argues that the court's erroneous limitation of the term "secured" is evidenced by the fact that such limitation would render claim language found in related patents to be superfluous. (Pl.'s Mem. Law Concerning Impact *Phillips v. AWH Corp.* Matter at 3-4.) The Federal Circuit has cited the principle that a court should normally construe the same terms consistently across patents created from the same parent application when they share a single written description. *See, e.g., NTP, Inc. v. Research in Motion, Inc.*, 2005 WL 1806123, ___ F.3d ___, (Fed. Cir. Aug. 2, 2005). In regard to the '471 Patent and its parent application, Patent No. 5,806,210 (the "'210 Patent"), the patents share the same written description, and the written description of the '210 Patent includes the same language of disavowal that is present in the '471 Patent: "In a radical departure from conventional shoes, *the shoe of the present invention incorporates a heel structure, including a detachable rear sole*, that significantly alleviates heel wear problems associated with conventional soles and provides enhanced cushioning and/or spring." '210 Patent, col. 4, 11. 51-56 (emphasis added). The '210 Patent is not at issue in this litigation, and the court will not address whether this language creates an express disclaimer of claim scope in that patent. For the purposes of this litigation, the disclaimer in the '471 Patent is not per se inapplicable to the same

language found in other, related patents that use the same written description. This rule of construction does not require the court to ignore a patent's express disclaimer of claim scope.

Plaintiff next argues that the main thrust of the claims in the patents-in-suit is the so-called "flexible member," which is a distinct feature from the detachable or repositionable sole not claimed in the '300 or "471 Patents. The language of disclaimer on which the court relies relates only to the detachable or repositionable sole, and so, Plaintiff argues, this language should be held inapplicable to the claim terms in these patents. (Pl.'s Mem. Law Concerning Impact *Phillips v. AWH Corp.* Matter at 5.) The court finds this argument without merit. The court must take the patent as it exists on the public record, and cannot pick and choose which aspects of the written description should apply and which should not. All of the language and figures contained in the specification comprise the "context" of the patent discussed in *Phillips*, and it must be considered as a whole. *Phillips*, Nos. 03-1269, 03-1286, slip op. at 10 (stating that a person of ordinary skill "is deemed to read the claim term . . . in the context of the entire patent"). If Plaintiff wished for certain language in the specification to be considered inapplicable to the claims, it should have left that language out of the specification. Because it remains in the patent, the court must consider it.

Plaintiff's final argument, that the court improperly used the specification to provide "structure" to the term "secured," is also without merit. (Pl.'s Mem. Law Concerning Impact *Phillips v. AWH Corp.* Matter at 7.) The court's limitation on the term "secured" was not occasioned by the term's lack of structure in the claims, and the court did not find any such problem with the claims. Rather, the court found the explicit

language in the specification to be a clear disclaimer or disavowal of claim scope.

The Federal Circuit's en banc opinion in *Phillips* does not require that this court alter its previous ruling. Therefore, the court reiterates its finding that the language of disclaimer or disavowal of scope in the '300 and '471 Patents, discussed at length in the Claim Construction Order, serves to limit the scope of the term "secured" as discussed in the prior opinion.

B. The Other Disputed Terms

The remainder of the disputed terms were given their plain and ordinary meaning by this court, and the analysis appears to remain fully supported after *Phillips*. The "flexible plate" was given its plain and ordinary meaning after consideration of the written description. (Mem. Op. & Order of May 17, 2005 at 32.) The "direction substantially perpendicular" was given its plain and ordinary meaning after an assessment of the written description and a limited review of the "300 Patent's prosecution history. (*Id.* at 38, 44.) The terms "concave," "oriented toward a back of the shoe," and "element" were all given their ordinary meaning after assessing the claim terms themselves and the specification. (*Id.* at 45, 48, 50.) Indeed, the plain and ordinary meaning of the terms was generally not at issue. The parties merely disputed whether this definition should apply in light of other facts.

Although the court relied heavily on dictionary definitions in construing the terms, it attempted to use the dictionary only as a convenient resource to compose the definitions. The use of dictionaries in composing the definitions of nontechnical terms was approved in *Phillips*. *See Phillips*, 415 F.3d 1303 at 28 (describing dictionaries as

"useful" and stating "we do not intend to preclude the appropriate use of dictionaries"). The *Phillips* court was concerned, however, with a court beginning its analysis with the dictionary because such definitions are often quite expansive and could give the terms undue breadth. *Id.* at 26. This court considered several arguments for narrowing the scope of the disputed terms, but found none of them warranted a more restrictive construction. The court believes it attached the appropriate weight to the claims and the specification, and that its use of dictionary definitions was consistent with the patentee's use of the terms within the patent. The terms at issue here were not technical terms subject to any unique definitions in the field of athletic shoe design, and the use of a standard English-language dictionary was appropriate and helpful in composing the claim constructions.

After reviewing the patents-in-suit, the disputed terms, and the Claim Construction Order, the court finds that *Phillips* would not require any change in the constructions given. Thus, the court reaffirms its prior ruling on the remaining disputed terms.

III. PLAINTIFF'S MOTION FOR PARTIAL RECONSIDERATION

Before the Federal Circuit issued its *Phillips* opinion, Plaintiff moved for reconsideration of the Claim Construction Order on a number of grounds. The Claim Construction Order is not a final judgment or order in this case, but is an interlocutory ruling. District courts have the power to reconsider their interlocutory rulings at their discretion until a final judgment has been entered in the case. *Moses H. Cone Mem'l Hosp. v. Mercury Constr. Corp.*, 460 U.S. 1, 12, 103 S. Ct. 927, 935 (1983); *American Canoe Ass'n v. Murphy Farms, Inc.*, 326 F.3d 505, 514-15 (4th Cir.

2003). The Federal Rules of Civil Procedure do not set out any standard for reconsideration of interlocutory orders, but only provide they are "subject to revision at any time before the entry of judgment." Fed. R. Civ. P. 54(b).

Various judicial doctrines, such as the "law of the case," have evolved to guide a court's discretion. Public policy favors an end to litigation and recognizes that efficient operation requires the avoidance of rearguing questions that have already been decided. *See Official Comm. of Unsecured Creditors of Color Tile, Inc. v. Coopers & Lybrand, L.L.P.*, 322 F.3d 147, 167 (2d Cir. 2003) ("Where litigants have once battled for the court's decision, they should neither be required, nor without good reason permitted, to battle for it again." (internal quotations omitted)). Most courts have adhered to a fairly narrow set of grounds on which to reconsider their interlocutory orders and opinions. Courts will reconsider an interlocutory order in the following situations: (1) there has been an intervening change in controlling law; (2) there is additional evidence that was not previously available; or (3) the prior decision was based on clear error or would work manifest injustice. *See Official Comm.*, 322 F.3d at 167; *United States v. Duke Energy Corp.*, 218 F.R.D. 468, 474 (M.D.N.C. 2003); *Potter v. Potter*, 199 F.R.D. 550, 552-53 (D. Md. 2001).

Plaintiff raises several arguments in support of its motion to reconsider. First, it contends that the court should consider a recent statement by the patent examiner of the '300 Patent, stating she construed the term "secured" during the prosecution of this patent to have its plain and ordinary meaning. This statement was made during the prosecution of a later, but related, patent. Presumably, Plaintiff considers this to be additional evidence that was not previously available. Defendant argues, among other things, that this

statement is extrinsic evidence and should not be considered by the court.

The court will not consider the examiner's statement as additional evidence because it is extrinsic to the '300 Patent. The intrinsic record is fixed when the patent is granted. *Texas Digital Sys. v. Telegenix, Inc.*, 308 F.3d 1193 at 1202; *see also Vitronics*, 90 F.3d at 1583 ("The claims, specification, and file history . . . constitute the public record of the patentee's claim, a record on which the public is entitled to rely."). Here, the patent examiner made the statement during the prosecution of a different patent nearly two years after the '300 Patent issued. In arguing for relevancy, Akeva cites to *Microsoft Corp. v. Multi-Tech Systems, Inc.*, 357 F.3d 1340 (Fed. Cir. 2004), *cert. denied*, ___ U.S. ___, 125 S. Ct. 61 (2004), but the *Microsoft* court did not rely on subsequent statements by the patent examiner. Rather, it relied on the patentee's statements as evidence of how it understood its own invention, and it used these statements to narrow the meaning of the claims. *Id.* at 1349-50. Here, Akeva attempts to use the examiner's statement to broaden the scope of its claims, a proposition unsupported by the case law Akeva cites.[2] *See also Chimie v. PPG Indus., Inc.*, 402 F.3d 1371, 1384 (Fed. Cir. 2005) ("The purpose of consulting the prosecution history in construing a claim is to 'exclude any interpretation that was disclaimed during prosecution.'") (quoting *ZMI Corp. v. Cardiac Resuscitator Corp.*, 844 F.2d 1576, 1580 (Fed. Cir. 1988). As such, the patent examiner's statement will not be considered.

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[2] The examiner's statement, even if considered, would be unhelpful to the court because it is quite vague. The examiner states that she used the ordinary meaning of "secured," but she does not elaborate on what this "ordinary meaning" was.

Plaintiff next advances several arguments grounded on the notion that the court committed error in its claim construction analysis. Plaintiff contends that the court either failed to recognize certain aspects of the patent specifications or incorrectly understood the inventions. The asserted errors do not appear to rise to the level of "clear error." Many of the references Akeva cites were discussed in the Claim Construction Order, and other references were available to the court.[3] Akeva's arguments point out, at most, possible errors of analysis which are better addressed on appeal. The court will not allow the parties to reargue claim construction.[4]

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[3] The argument that comes closest to an assertion of clear error is that the court failed to understand the '300 Patent discloses two inventions: the claimed rear sole and the claimed flexible plate. The court disagrees with Akeva's notion, although the difference may be one of pure semantics. In the court's opinion, the 300 Patent discloses a single invention, which is a shoe with two features, a rear sole and a flexible plate (with characteristics as claimed).

[4] It may be helpful for the court to address one argument made by Plaintiff contending the court failed to recognize an embodiment in which part of the rear sole is permanently fixed in place and part is rotatable or adjustable. This embodiment is not excluded from the court's construction of "secured" as used in the '300 Patent. The court construed the term to mean that a rear sole "secured" is one that is "selectively or permanently fastened, but not permanently fixed in position." (Mem. Op. & Order of May 17, 2005 at 25.) A rear sole in which only one portion (e.g., the periphery of the sole) can be rotated, moved, removed, or similarly physically adjusted could be encompassed within this definition because the rear sole, as a whole, would not be permanently fixed in position. The court declines to adjust its construction on this ground.

Because Plaintiff has not advanced any situation compelling the court to reconsider the Claim Construction Order, the court declines to reconsider its opinion further.

IV. CONCLUSION

For the reasons set forth above,

IT IS ORDERED that after reconsideration of its ruling in light of an intervening change in the law in *Phillips v. AWH Corp.*, the court reaffirms its analysis and the claim constructions in the Memorandum Opinion arid Order of May 17, 2005;

IT IS FURTHER ORDERED that Plaintiffs' Motion for Partial Reconsideration of the Court's Claim Construction Order [135] is DENIED.

This the 26th day of August 2005.

William L. Osteen, United States District Judge

Appendix C

UNITED STATES DISTRICT COURT FOR THE MIDDLE DISTRICT OF NORTH CAROLINA

1:03CV01207

AKEVA L.L.C.,
Plaintiff,

v.

aDIDAS[1] AMERICA, INC.,
Defendant.

MEMORANDUM OPINION and ORDER

OSTEEN, District Judge

Plaintiff Akeva L.L.C. ("Akeva") brings this patent infringement action against Defendant adidas America, Inc. ("adidas"). Plaintiff asserts Defendant infringed United States Patent No. 6,604,300 entitled "Athletic Shoe with Improved Sole" ("'300 Patent") and United States Patent No. 6,662,471 entitled "Athletic Shoe with Improved Heel Structure" ("'471 Patent"), in violation of 35 U.S.C. § 271(a) and (b). The patents were acquired by inventor David F. Meschan and assigned to Akeva.

A determination of patent infringement requires two steps. *Markman v. Westview Instruments. Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370, 391, 116 S. Ct.

[1] The company's trade name begins with a lowercase "a."

1384, 1396 (1996). First, the "meaning and scope of the patent claims asserted to be infringed" must be determined. *Id.* Second, the properly construed claims must be compared to the product that is accused of infringing. *Id.* The first step, an assessment of the meaning and scope of patent claims, is a matter of law and, thus, the duty of the district court. This has now been the subject of full briefing by the parties and a hearing (the "*Markman* hearing"), and the court herein sets out the proper construction of the disputed claim terms in the '300 and '471 Patents.

I. FACTUAL BACKGROUND

Many aspects of the '300 Patent, and a few details of the '471 Patent, are in contention. This section gives a general description of the claimed inventions, with more complete descriptions of the claims given in the Analysis section, below.

A. The 6,604,300 Patent

The '300 Patent discloses an athletic shoe with a rear sole whose features enhance the usefulness, durability, and performance of the shoe. Beginning with Claim 93, which is the first claim Akeva asserts is infringed, the patent discloses a rear sole "secured" below the heel region of the shoe. The heel region incorporates a flexible plate that is supported at its periphery, has a void beneath its interior area, and is capable of deflection at its interior. Generally speaking, the flexible plate acts like a trampoline, cushioning the impact of the wearer's heel and providing extra spring. The '300 Patent claims several variations on this theme. Central to one of the disputes is a feature wherein the heel can be separated from the rest of the shoe by the wearer, allowing a new heel to be attached in its place. This allows the wearer to replace the heel when it becomes worn or when the wearer

needs different cushioning and spring properties for a different activity, such as playing basketball rather than running. There is also a feature that allows the heel to be rotated by the wearer so that the fast-wearing, ground-engaging portion located at the very back of the heel is no longer ground-engaging, thereby giving the heel a longer life. The parties disagree whether the "spirit" of the invention should be the flexible plate, as Plaintiff contends, or the removability and rotatability of the heel, as Defendant argues.

B. The 6,662,471 Patent

The '471 Patent discloses an athletic shoe heel that is constructed in the shape of a "U" lying on its side. This recumbent U is made of top and bottom walls generally parallel to each other and joined at one end by a curved wall or bend. As a wearer adds weight to the heel, the structure absorbs the impact. The energy in the components of the recumbent U add spring by returning to their original positions after deflection and as the wearer's weight shifts. A "stiffening member" can be added at the bend between the walls to increase this springing effect.

II. ANALYSIS

Here, the court tackles the first step in a patent infringement determination, which is to construe the language of the patent. First, an explanation of the appropriate method of analysis is given, including the evidence a district court may properly consider and the weight to be given to different types of evidence. Second, the court construes the disputed claim terms.

A. Applicable Law

1. The Court Should Consider Intrinsic Evidence to Construe the Claims, and May Consider Extrinsic Evidence, if Needed.

A court should use three sources to determine the meaning of claims: (1) the language of the claims themselves, (2) the patent's specification, and (3) the patent's prosecution history. *Markman*, 52 F.3d at 979. These three sources are the intrinsic evidence and should always be consulted.

A court should "first . . . look to the words of the claims themselves, both asserted and nonasserted, to define the scope of the patented invention." *Vitronics Corp. v. Conceptronic. Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). The second step is to look to the specification. The claims define the invention, but the specification "is always highly relevant" and "is the single best guide to the meaning of a disputed term." *Id.* Within the specification is a written description of the invention that would allow someone skilled in the art to make the invention described. *Markman*, 52 F.3d at 979. "For claim construction purposes, the description may act as a sort of dictionary, which explains the invention and may define terms used in the claim." *Id.* Claim terms "must be read in view of the specification, of which they are a part." *Id.* A court should consider, for instance, whether the specification uses terms inconsistently with their ordinary meaning. *See Vitronics*, 90 F.3d at 1582. A court should also consider any explicit statements of meaning, such as when a patentee has acted as his own lexicographer, giving special definitions to words used in the specification. If the patentee has clearly redefined a word in the specification, then the meaning of that word or term will be construed in the way the patentee has defined, rather than

using the word's ordinary meaning. *Markman*, 52 F.3d at 980. However, the specification and its written description "do[] not delimit the right to exclude" others from using the information because "that is the function and purpose of claims." *Id.*

The prosecution history, sometimes called the "file wrapper," is the third type of intrinsic evidence to consult, if it is in evidence. *Id.*; *Vitronics*, 90 F.3d at 1582. "This 'undisputed public record' of proceedings in the Patent and Trademark Office is of primary significance in understanding the claims." *Markman*, 52 F.3d at 980. The "specification and claims are in the words of the patentee" and the construction they bear on their face "may be confirmed by what the patentee said when he was making his application." *Id.* (quoting *Goodyear Dental Vulcanite Co. v. Davis*, 102 U.S. 222, 227, 12 Otto 222 (1880)). If the patentee disclaimed or surrendered scope in order to obtain an allowance of the claims, such as to distinguish the invention from prior art, then the patentee would be estopped from reincorporating this disclaimed scope into the claims. *Pall Corp. v. Micron Separations. Inc.*, 66 F.3d 1211, 1218 (Fed. Cir. 1995). "Although the prosecution history can and should be used to understand the language used in the claims, it . . . cannot 'enlarge, diminish, or vary' the limitations in the claims." *Markman*, 52 F.3d at 980 (quoting *Goodyear Dental Vulcanite*, 102 U.S. at 227).

When the intrinsic evidence fails to resolve an ambiguity in a disputed term, extrinsic evidence may be consulted. *Vitronics*, 90 F.3d at 1583. This evidence includes all evidence outside the patent and its prosecution history, such

as expert testimony,[2] the inventor's testimony, a company's marketing materials or other statements, dictionaries, and learned treatises. *Markman*, 52 F.3d at 980. A court may use this evidence to aid its understanding of the patent, but may not use it to vary or contradict the terms used in the claims. *Id.* at 981. The use of extrinsic evidence is only proper if the intrinsic evidence – the public record – is unclear. *Vitronics*, 90 F.3d at 1583.

2. The Court Should Begin Its Construction with the Claim Language.

"In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves." *Tex. Digital Sys. v. Telegenix, Inc.*, 308 F.3d

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[2] The Federal Circuit has indicated aversion to the use of expert testimony in claim construction. In *Markman*, the court stated that the testimony of the inventor and his patent attorney was entitled to no deference because it amounted to no more than a legal opinion on the proper construction of the claims. *Markman v. Westview Instruments. Inc.*, 52 F.3d 967, 983 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370, 391, 116 S. Ct. 1384, 1396 (1996). In a later decision, the Federal Circuit went further: "*Markman* requires us to give no deference to the testimony of the inventor about the meaning of the claims." *Hoechst Celanese Corp. v. BP Chems. Ltd.*, 78 F.3d 1575, 1580 (Fed. Cir. 1996) (emphasis added). Additionally, the Federal Circuit has stated that any expert testimony, "whether it be of an attorney, a technical expert, or the inventor, on the proper construction of a disputed claim term . . . may only be relied upon if the patent documents, taken as a whole, are insufficient to enable the court to construe disputed claim terms." *Vitronics Corp. v. Conceptronic. Inc.*, 90 F.3d 1576, 1585 (Fed. Cir. 1996). The court continued that in such "rare instances," prior art documents and dictionaries are preferred because they are objective, reliable, and are accessible to the public at the time of the invention. *Id.*

1193, 1201 (Fed. Cir. 2002) (internal quotations omitted). There is a "heavy presumption" that the terms in the claims "mean what they say and have the ordinary meaning that would be attributed to those words by persons skilled in the relevant art." *Id.* at 1202. To consult the written description and prosecution history before looking to the ordinary meaning would risk importing limitations into the claims and would violate the precedent of the Federal Circuit. *Id.* at 1203. It could lead a court, for example, to use an embodiment of the invention to limit the claim terms. This would be error, however, because embodiments should serve only as an exemplary form.

In determining the ordinary meaning, a court may look to dictionaries and treatises, which have been long considered "particularly useful resources." *Id.* at 1202. Although a dictionary or treatise is extrinsic evidence, it is to some extent an exception to the general rule. "Judges are free to . . . rely on dictionary definitions when construing claim terms, so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents." *Vitronics*, 90 F.3d at 1584, n.6. A patent serves as public notice of its claims, and the dictionaries, encyclopedias, and other references "publicly available at the time the patent is issued[] are objective resources that serve as reliable sources of information" on a term's meaning. *Tex. Digital*, 308 F.3d at 1202-03. These types of references are "unbiased reflections of common understanding," untainted by expert testimony, subsequent events, the parties' motives, and the litigation itself. *Id.* at 1203. A court may consult these materials at any time during litigation, whether introduced into evidence or not. *Id.* When a word has multiple definitions, a court should look to the intrinsic record to determine which of these meanings "is

most consistent with the use of the words by the inventor." *Id.*

Once the ordinary meaning is determined, the full intrinsic record "must be examined in every case to determine whether the presumption of ordinary and customary meaning is rebutted." *Id.* at 1204. The ordinary meaning may be rebutted or limited in three situations relevant here. *See CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002). First, it will be rebutted if "the patentee, acting as his or her own lexicographer, has clearly set forth an explicit definition of the term different from its ordinary meaning." *Tex. Digital*, 308 F.3d at 1204. In this situation, the statement made in the specification "must have sufficient clarity to put one reasonably skilled in the art on notice that the inventor intended to redefine the claim term." *Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1370 (Fed. Cir. 2005). Second, ordinary meaning will be rebutted if "the inventor has disavowed or disclaimed scope of coverage, by using words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope." *Tex. Digital*, 308 F.3d at 1204. In this situation, the patentee has "distinguished his invention from a prior art reference, expressly disclaimed subject matter, or highlighted a particular feature as important to the invention." *W.E. Hall Co. v. Atlanta Corrugating LLC*, 370 F.3d 1343, 1353 (Fed. Cir. 2004). A third situation that requires a definition other than the ordinary meaning is "where the term or terms chosen by the patentee so deprive the claim of clarity that there is no means by which the scope of the claim may be ascertained from the language used." *Johnson Worldwide Assocs. v. Zebco Corp.*, 175 F.3d 985, 990 (Fed. Cir. 1999); *see also Tex. Digital*, 308 F.3d at 1204.

The redefinition of a claim term (and, thus, the rebuttal of its ordinary meaning) must be unambiguous enough to put one skilled in the art on notice of the different meaning. *Bell Atl. Network Serv. v. Covad Comms. Group, Inc.*, 262 F.3d 1258, 1268 (Fed. Cir. 2001). If a claim term merely is susceptible to more than one interpretation, the intrinsic evidence is ambiguous, or if the patentee's intent to depart from the ordinary meaning is less than clear, the inventor cannot be said to have clearly set out his own definition of that term and the ordinary meaning is not rebutted. *See Merck*, 395 F.3d at 1371; *W.E. Hall*, 370 F.3d at 1353. Additionally, inconsistency will not be enough. "Varied use of a disputed term in the written description demonstrates the breadth of the term rather than providing a limited definition." *Johnson Worldwide*, 175 F.3d at 991.

While redefinition must be clear, it need not be explicit. *Bell Atl.*, 262 F.3d at 1268. "The specification may define claim terms 'by implication' such that the meaning may be 'found in or ascertained by reading of the patent documents.'" *Id.* (quoting *Vitronics*, 90 F.3d at 1582). A patentee may be said to have defined a claim term by implication if he has used the term "throughout the entire patent specification [] in a manner consistent with only a single meaning." *Id.* at 1271. In *Bell Atlantic*, the court looked to the written description to construe the term "mode," which it found "broad and amorphous" enough to require some limitation. *Id.* at 1269. In reviewing the written description, the Federal Circuit found the patentee's statement that the system "operates in one of three selectable modes," followed by descriptions of three modes, limited the term and showed it to be distinct from the "rate" of data flow. *Id.* at 1272. The court rejected the notion that it was limiting the claim term based on a preferred embodiment because there was no authority that allowed a broadening of

claim terms "beyond their support in the specification." *Id.* at 1273 (internal quotations omitted). Also, the patent had been consistent in its redefined use of "mode" throughout the specification. *Id.*

B. The Parties' Methods of Analysis

The parties, in proposing their preferred claim constructions to the court, take different views of the proper claim construction analysis. Akeva argues, with regard to all its proposed constructions, that the claim terms should be defined according to their plain and ordinary meaning. It is the claim terms, it asserts, not the written description, figures, or other segments of the patent, that define the scope of its property rights. While the specification must provide enough support for the claims sufficient to teach someone skilled in the art how to make or use the invention, the specification should not be used to limit the claims. To this end, Akeva relies heavily on dictionary definitions.

As Akeva asserts, deviation from the heavy presumption of plain and ordinary meaning is only allowed when the patentee has chosen to be his own lexicographer and redefined a term, or when the "term lacks such clarity that there is 'no means by which the scope of the claim may be ascertained from the language used.'" (Mot. & Mem. Supp. Claim Construction of Akeva L.L.C. ("Akeva's Markman Brief") at 8 (quoting *Novartis Pharms. Corp. v. Abbott Labs.*, 375 F.3d 1328, 1334 (Fed. Cir. 2004)).) A definition contrary to the ordinary meaning is only supported by a "deliberate and clear preference for this alternative definition." (*Id.* at 10 (quoting *Kumar v. Ovonic Battery Co.*, 351 F.3d 1364, 1368 (Fed. Cir. 2003)).) Akeva also emphasizes that when the specification describes embodiments of the invention, these embodiments should be taken as examples only, and not as limitations on the claims.

A description of a "preferred" embodiment or an omission of a possible embodiment does not affect the requirement that the claims should be given "the full breadth of their plain meaning." (*Id.* at 9.)

adidas, on the other hand, takes a more context-specific view. adidas focuses on the "objective test" of what the claims would have meant to someone skilled in the art at the time of the invention. (adidas' Markman Br. Correct Constr. Disputed Claim Terms ("adidas' Markman Brief") at 2.) This requires a review of the claim language, the specification, and the prosecution history, but with more, focus on the specification than Akeva would support. adidas argues the court must look, first, to the ordinary meaning of the claim terms. "If the ordinary meaning is consistent with the manner in which the patentee uses the term in the claim, specification, and prosecution history, then the term is construed to have its ordinary meaning." (*Id.* at 3.) If there is more than one possible ordinary meaning, the correct definition will be the one that best comports with the way the patentee uses the term in the claims, specification, and prosecution history. If no ordinary meaning is consistent with the patentee's use, then the court must reject ordinary meaning and construe the term according to the patentee's use. adidas relies on the notion that "the meaning of a technical term in a patent claim is determined in accordance with its *usage in the specification*, elaborated if appropriate by the prosecution history and with due consideration to usage in the field of invention." (*Id.* (quoting *Norian Corp. v. Stryker Corp.*, 363 F.3d 1321, 1326 (Fed. Cir. 2004)).)

The analyses advocated by the parties, although somewhat inconsistent, are supported by Federal Circuit precedent. Over the years, the Federal Circuit has taken two approaches to claim construction: one focused on the claim

language and a second focused on the specification that is more likely to read limits into claims. John Josef Molenda, *Understanding the Federal Circuit's Internal Debate and Its Decision to Rehear Phillips v. AWH Corp. En Banc*, 86 J. Pat. & Trademark Off. Soc'y 911, 911 (2004). The court's most recent decisions appear to be shifting away from the specification-based approach and back to a claims-based approach. *Id.* at 920-21. However, the court has granted a rehearing en banc in the case of *Phillips v. AWH Corp.*, specifically focused on seven questions that encompass the vast majority of its claim construction doctrine. 376 F.3d 1382 (Fed. Cir. 2004). The outcome of this case could settle several questions on the appropriate method of analysis. However, until and unless the Federal Circuit amends its claim construction doctrine, this court must apply the law as it now stands.

C. The 6,604,300 Patent's Disputed Claim Terms

The first independent claim of the '300 Patent that Akeva asserts is infringed by adidas is Claim 93. This claim discloses the following invention (emphasis added to disputed terms):

> 93. A shoe comprising:
>
> an upper having a heel region;
>
> a rear sole *secured* below the heel region of the upper;
>
> and
>
> a *flexible plate* having upper and lower surfaces and positioned between at least a portion of the rear sole and at least a portion of the heel region of the upper, *peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a direction substantially perpendicular to a major*

> *axis of the shoe so that the interior portion of the plate is capable of being deflected relative to the peripheral portions in a direction substantially perpendicular to the manor axis of the shoe,* the *upper surface having at least one concave portion,* and the lower surface being at least in part visible from outside of the shoe.

Several of these terms appear in subsequent independent claims 117, 118, 121, 122, 192, and 204 and their dependent claims, which Akeva asserts are also infringed by adidas.

1. "Secured"

Both the '300 Patent and the '471 Patent use the term "secured," and the court will address its meaning in both patents in this section. The plain and ordinary meaning is not contested by the parties. In the context of a physical object, "to secure" is "to make fast: tie down." Webster's Third New Int'l Dictionary 2053 (1986). Akeva asserts that "secured" should be interpreted according to its plain and ordinary meaning of "fastened" or "attached," which would encompass permanent, removable, and rotatable attachment. adidas, on the other hand, argues that this plain meaning is rebutted because the specifications do not use the word to mean simply "fastened." Rather, the specifications contemplate that the heels "secured" to the shoe are always removable, or "selectively locked into position." The court will first address the proper construction of the term "secured" in light of the specification of the '300 Patent, and then address the proper construction in light of the '471 Patent's specification.

With regard to the '300 Patent, adidas' argument relies, first, on the introductory portion of the written description that details the background and summary of the invention.

The background discusses three problems with the state of the art for athletic shoes: (1) outsole wear, wherein the outer periphery of the heel wears out much faster than the rest of the shoe and requires replacement of the entire shoe when most of it remains in good shape; (2) midsole compression, wherein the midsole loses its cushioning effect, especially in the heel area; and (3) lack of customization options, which requires the costly acquisition of a different shoe for each type of athletic activity (e.g., tennis, basketball, running), creates an inability to customize shoes to an individual wearer's weight and preferences, and leaves few options for those suffering from foot or leg injuries or other irregularities. '300 Patent, col. 1, l. 32-col. 2, l. 12. It further describes that

> to achieve [advantages to be set forth in the written description, claims, and drawings] and in accordance with the purpose of the invention . . ., the shoe includes an upper having a heel region, a rear sole *secured* below the heel region of the upper, and a rear sole support *attached* to the upper and *configured to secure* the rear sole below the heel region of the upper.

Id., col. 2, ll. 27-33 (emphasis added). The written description later states, "The *present invention* includes a shoe or shoe kit *which includes or can accept a plurality of rear soles* 150[3] having different characteristics and/or surface configurations, thereby providing a cross trainer shoe." *Id.*, col. 6, ll. 33-36 (emphasis added).

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[3] In quotations of the patents in suit, the court has generally included the patentee's numerical references to components depicted in the specification.

adidas also points to several examples of language in the specification that support its argument for a more limited construction of "secured." Most notably, the specification states, "In *all embodiments, the invention includes* mechanical means for selectively locking the rear sole relative to the rear sole support and upper of the shoe." *Id.*, col. 7, 11. 17-20 (emphasis added). The specification also describes a manner for connecting a rear sole to a rear sole support, illustrated in Figure 2 in the specification:

> *To secure* rear sole 150 to rear sole support 140, rear sole 150 is simply press-fitted into . . . . *This manner of locking* rear sole 150 into the shoe at any one of several positions is one of several mechanical ways in which the rear sole can be removed, repositioned, and/or locked to the rear sole support or other part of a shoe.

Id., col. 5, 11. 14-20 (emphasis added). The specification further describes that "since rear sole 150 . . . is selectively positionable relative to rear sole support 140 . . ., it may be moved to a plurality of positions with a means provided to allow the user *to secure* the rear sole at each desired position." *Id.*, col. 6, 11. 46-51 (emphasis added). The specification's written description explains that the shoe depicted in its Figure 1 "also includes a rear sole 150 that is *detachably secured* to and/or rotatably positionable relative to rear sole support 140." *Id.*, col. 4, 11. 43-45 (emphasis added).

Akeva argues, in opposition to adidas' proposed construction, that the '300 Patent's specification does not purport to redefine the term "secured," nor does it disavow the plain and ordinary meaning. For this reason, it would be legal error to construe the term "secured" to incorporate adidas' additional limitation of "detachable." The written

description, Akeva argues, references permanently attached rear soles as a possible embodiment: "The flexible region also need not be used only in conjunction with a detachable rear sole, but can be used with permanently attached rear soles as well." *Id.*, col. 10, 11. 14-16. If "secured" meant "detachably secured," it would exclude this disclosed embodiment of the patent, which is a violation of a basic rule of claim construction. Akeva also argues that the term "secured" is used in contexts where detachability is not contemplated, such as in reference to a flexible member that may "have a U-shaped cushioning member placed on or *secured* to their top surface." *Id.*, col. 11, 11. 59-60. The written description does not use "secured" exclusively in referencing the connection of the rear sole to the rest of the shoe, because "attached" is used in discussing the connection between the rear sole and the rear sole support: "the rear sole is *attached* to the rear sole support." *Id.*, col. 8, 11. 24-25. Finally, Akeva argues that Meschan's previous patents show that when he wants to claim detachability, he makes a specific reference to this feature. Claim 25 of Meschan's prior U.S. Patent Number 5,560,126 (the "'126 Patent"), incorporated by reference into the '300 Patent, includes the component "a rear sole secured below the heel region of the upper," and then makes a dependent claim 40 that references "the shoe of claim 25, including means for detachably securing the rear sole below the heel region." U.S. Patent No. 5,560,126 (issued Oct. 1, 1996), col. 16, 11. 40-53. If the meaning of "secured" included the notion of detachability, this would impermissibly merge Claims 25 and 40 in the '126 Patent, another violation of a rule of claim construction.

Akeva is correct that the term "secured" as used in the '300 Patent's claims should not be construed to mean "detachably secured." This limitation is neither in the plain

meaning of "secured," nor does the written description disavow an invention with a permanently attached rear sole. For instance, the written description describes an embodiment wherein the rear sole is rotatable so that the "worn portion will no longer be in the location of the user's first heel strike" and states that "the rear sole may be rotated without separating it from the rear sole support." '300 Patent, col. 6, 11. 58-63. The written description later reiterates that "the rear sole may not be removable but only rotatably positionable." *Id.*, col. 7, 11. 42-43. However, adidas' proposed construction of "selectively locked into position" does not require detachability. As the patent's written description points out, the rear sole of a shoe could be selectively locked into position (e.g., rotatable) without also being detachable from the shoe.

While the specification does not disavow permanent attachment, it does contain an express statement that disclaims a rear sole permanently fixed in place. The written description specifically states that "in *all embodiments*, the invention includes mechanical means for selectively locking the rear sole relative to the rear sole support and upper of the shoe." *Id.*, col. 7, 11. 17-20 (emphasis added). While this statement uses the word "includes," generally interpreted in claim language as an open-ended word allowing for other possible features, Manual of Patent Examining Procedure § 2163.II.A.I. (8th ed., rev. 2 2004), it does not appear possible that the invention could include mechanical means for selectively locking the rear sole relative to the rear sole support and shoe upper, while also including a rear sole that is permanently fixed into position relative to the rear sole support and shoe upper. This latter embodiment would require that no mechanical means be present to allow a user to selectively lock the rear sole in position. Either the user can choose the position of the rear sole, or she cannot.

In *SciMed Life Systems, Inc. v. Advanced Cardiovascular Systems, Inc.*, the Federal Circuit reviewed the construction of a patent in which the written description used similar "all embodiments" language. 242 F.3d 1337 (Fed. Cir. 2001). The court explained that "where the specification makes clear that the invention does not include a particular feature, that feature is deemed to be outside the reach of the claims of the patent." *Id.* at 1341. This is true even if the claim language, on its own, "might be considered broad enough to encompass the feature in question." *Id.* The specification in *SciMed* identified its lumen structure as coaxial rather than dual, discussed the disadvantages of a dual structure used in prior art, and described the coaxial lumen structure as "the basic sleeve structure for *all embodiments of the present invention contemplated and disclosed herein*." *Id.* at 1343. The court found this language defined the invention in a manner that excluded the dual structure, and it held it to be "a clear case of disclaimer of subject matter." *Id.* at 1344. The written description could not be discussing only a preferred embodiment because the defined structure was expressly applicable to "all embodiments of the present invention," words the court found "broad and unequivocal." *Id.* Indeed, the court went on to say that it would be "difficult to imagine how the patents could have been clearer" in making a coaxial lumen structure "a necessary element of every variant of the claimed invention." *Id.*

The potential reach of the *SciMed* decision has been narrowed in subsequent cases. First, any such disclaimer of subject matter must be explicit, and the mere absence of reference to an embodiment does not exclude that embodiment from the scope of the invention. *Liebel-Flarsheim Co. v. Medrad. Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004). Explicit disclaimer was found in *SciMed* because the specification (1) discussed only one type of structure, (2)

characterized an alternative structure as inferior, and (3) concluded that the preferred structure was used in "all embodiments of the present invention contemplated and disclosed herein." *Id.* No such disclaimer could be found in *Liebel-Flarsheim*, where the patent simply failed to describe an embodiment using the alternative structure. *Id.* at 907. Second, the disclaimer must be direct and clear. For example, where a patent described the filter and cap in a water bottle filter assembly as being "associated," this did not require "tenacious physical engagement." *Innova/Pure Water, Inc. v. Safari Water Filtration Sys.*, 381 F.3d 1111, 1121 (Fed. Cir. 2004). It only required that they be joined in some way. The reasoning of *SciMed* did not apply because the language was "less direct, clear and defining than the phrase '[the] structure . . . is the basic . . . structure for all embodiments.'" *Id.* at 1122 (quoting *SciMed*, 242 F.3d at 1344); *see also Honeywell. Inc. v. Victor Co. of Japan Ltd.*, 298 F.3d 1317, 1326 (Fed. Cir. 2002) (holding there was no disclaimer of subject matter when the written description merely described one embodiment as preferable to another).

Despite the subsequent interpretations of *SciMed*, it appears to apply to the "all embodiments" statement appearing in Akeva's patent. Like in *SciMed* where the lumen could be in either coaxial or dual form, the securing of the rear sole here presents two possible forms: it may be permanently fixed in place or it may be movable (i.e., "locked into position") by the wearer of the shoe. These embodiments cannot exist simultaneously. The clear and unequivocal language in the written description that "all embodiments of the present invention" include a mechanical means for selectively locking the rear sole show an unmistakable choice of one form over the other, and an unqualified disclaimer of a permanently positioned rear sole from the subject matter of the invention.

The written description contains further evidence that the invention does not include a permanently positioned rear sole. The written description makes the statement: "The present invention includes a shoe or shoe kit which includes or can accept a plurality of rear soles [] having different characteristics and/or surface configurations, thereby providing a cross trainer shoe." '300 Patent, col. 6, 11. 33-36. This statement appears to mean that the rear sole must be removable or detachable from the shoe so that other rear soles can replace it. This disclaimer of permanent attachment is inconsistent with other statements in the specification that envision a rear sole that is rotatable but not detachable. This internal inconsistency in the specification is too equivocal to render it a disclaimer of permanently attached rear soles. *See Honeywell*, 298 F.3d at 1327 (stating that an internally inconsistent summary statement about the invention "was not well thought out" and so no conclusive weight could be attached to it, but finding support for a structure contemplated by the sentence's first portion). However, even these statements are consistent in supporting the idea that the rear sole can be moved into various positions, whether or not the rear sole can be detached from the shoe.

Like in *SciMed*, the '300 Patent's specification discusses only a rear sole that is movable. None of the language cited by Akeva refutes the notion that the rear sole must be movable. Akeva refers to the statement that the "flexible region . . . can be used with permanently attached rear soles." '300 Patent, col. 10, 11. 14-16. This statement excludes only the detachability feature, one which the court does not read into the claim term, and does not address the movability of the rear sole. Likewise, the remainder of Akeva's arguments

are addressed to the notion of detachability.[4] Akeva has cited no statement in the '300 Patent's specification, and the court has found none, that would contemplate a rear sole that is permanently locked into position.

Therefore, the '300 Patent's claim terms' reference to "a rear sole secured" is construed to mean "a rear sole selectively or permanently fastened, but not permanently fixed in position."

In the '471 Patent, Claim 1, from which all other claims depend, discloses "a shoe comprising . . . a rear sole *secured* below a portion of the upper." '471 Patent, col. 13, 11. 7-9. No further mention of detachability, rotatability, or moveability is made in the 32 claims of this patent.

The '471 Patent's specification, however, disclaims not only a permanently fixed rear sole, but a permanently attached rear sole. In the first paragraph of the specification, subtitled "Field of the Invention," the patentee states that the "present invention relates generally to multi-purpose athletic shoes and, more particularly, to athletic shoes with interchangeable/detachable rear soles." '471 Patent, col.1, 11. 13-15. Following this introduction is a discussion of the problems of prior art, which discusses the inability of other detachable rear sole designs (mostly designs regarding dress shoes) to solve various problems, and the obstacles involved in adapting conventional detachable heel designs to athletic shoes without compromising cushioning and other important properties. *See id.*, col. 1, 1. 18 - col. 2, 1. 31. The section titled "Summary of the Invention" gives a general

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[4] In its proposed findings submitted to the court shortly after the Markman hearing, Akeva proposed a construction of "secured" that defined it as "attached and encompasses permanent, rotatable, and removable attachment."

description of the invention by saying "[a] rear sole is detachably secured to the rear sole support." *Id.*, col. 3, 11. 14-15. Most importantly, the written description later provides that "in a radical departure from conventional shoes, the *shoe of the present invention incorporates a heel structure, including a detachable rear sole*, that significantly alleviates heel wear problems associated with conventional soles and provides enhanced cushioning and/or spring." *Id.*, col. 4, 11. 54-59 (emphasis added).

Like in *SciMed*, Akeva's '471 Patent discusses only a detachable rear sole. The '471 Patent also characterizes the lack of detachable rear soles in conventional shoe designs as inferior. In addition to the statements above, a section on related art laments that "the unmistakable commercial trend appears to be increased specialization, with no apparent industry-awareness of the fact that the use and function of an athletic shoe can be changed dramatically if it is simply given interchangeable rear soles."[5] *Id.*, col. 2, 11. 50-54. Finally, the '471 Patent's written description contains a clear and unequivocal statement limiting the "shoe of the present invention" to designs incorporating "a heel structure[] including a detachable rear sole." Although this language is not the same as the "all embodiments" language of *SciMed* or the '300 Patent, the reference to "the shoe of the present invention" is a clear reference to the scope of the entire invention, and not merely to one or more embodiments. The use of "including a detachable rear sole" to modify the heel structure of the invention requires that all heel structures of

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[5] The discussion of prior art continues: "Similarly, no athletic shoe manufacturer has yet to offer varying heel cushioning firmness in each shoe size, despite the fact that consumer body weight for each shoe size spans a huge spectrum." '471 Patent, col. 2, 11. 54-57.

this invention include a detachable rear sole. *See C.R. Bard. Inc. v. United States Surgical Corp.*, 388 F.3d 858, 865 (Fed. Cir. 2004) (finding that the phrases "the implant includes a pleated surface" and a "plug having a pleated surface" meant the "patent required the 'implant' or 'plug' to have a pleated surface").

Thus, the '471 Patent's use of "secured" in Claim 1 in describing the connection of the rear sole to the shoe must be construed to mean "a rear sole detachably secured below a portion of the upper."

2. "Flexible plate"

According to Akeva, the "flexible plate" in the '300 patent should be defined according to its plain and ordinary meaning of "a smooth, thin piece of material that is bendable but which does not deform permanently when bent." adidas argues that the plain and ordinary meaning is rebutted because the term is "coined" by the patentee. The specification uses the terms "flexible" and "plate" in a manner inconsistent with their ordinary meanings. The plain and ordinary meaning of "flexible," adidas argues, is "capable of being bowed [i.e., bent down] without breaking" and the plain and ordinary meaning of "plate" is a piece of material that is flat, relatively thin, smooth and of uniform thickness, (adidas' Markman Br. at 12-13.) However, in the specification, a "plate" is not flat, smooth, or of uniform thickness, and "flexible" requires a convex or arched shape. To stay true to the patent, adidas argues, the flexible plate should be defined as "a separate and removable piece of material that is capable of being repeatedly bent from a normal, unflexed state (in which its central portion is elevated relative to its periphery) into a flexed state (in which the central portion is bent downward), without deforming permanently." (*Id.* at 12-13.)

adidas cites the following statement in support of its argument that the flexible plate must be elevated in the interior: "In each of the embodiments the central portion of the flexible member is raised relative to its outer perimeter so that when placed in the shoe, the interior portion in its normal state does not touch the rear sole support and/or rear sole." '300 Patent, col. 12, 11. 34-41. This statement does not support any limitation on the term "flexible plate." The structure with an elevated center is carefully set out as one possible embodiment of the flexible plate. The first phrase of the sentence, "in each of the embodiments," appears to refer to the embodiments described in the preceding sentence. That sentence begins "in each of the above described embodiments, ..." The "embodiments" in these sentences are not meant to encompass all possible embodiments of the invention, but only the ones the patentee has chosen to describe in the specification. In any case, to find any limitation in the structure of the flexible plate, the court would require a more direct and clear reference, along the lines of the "all embodiments" language used in *SciMed*, or a more explicit definition of the "flexible plate."

adidas argues, also, that the plate need not have a uniform thickness because the specification discloses an embodiment that is thicker at the center than at the periphery. *See* '300 Patent, col. 11, 11. 27-32. The description of one embodiment that does not fit within the technical definition of "plate" is not enough of an inconsistency to limit the claim. The word "plate" is not being used here in a highly technical or scientific way, but instead is a description of the shape of the component. Additionally, there is no indication that the plate must be thicker at the center than at the periphery, only that it may be so constructed.

Finally, adidas argues that a "flexible plate" cannot be integral with the shoe and must be construed as a separate and removable component. adidas contends that the written description refers mostly to a flexible region, which can take several forms, but the flexible plate is an embodiment of the flexible region that cannot be integral with other parts of the shoe. For example, the written description provides that "flexible region 200 can be incorporated into other elements of the shoe or can be a separate flexible member or plate." '300 Patent, col. 7, 11. 63-64. In the court's view, however, the patent appears to use the terms interchangeably. For instance, in referring to components depicted in the figures, the written description refers to both "flexible region 200" and "flexible member 200," and also to "flexible member 500" and "flexible plate 500." Additionally, the specification states that "any of the above-described flexible members may be used as flexible region 700." *Id.*, col. 12, 11. 58-59. The written description also contemplates that the flexible members may be integral with other components. For example: "flexible member 200 could be . . . incorporated as an integral part [] of either the rear sole support or the rear sole," and "similar configurations of an integral flexible region are within the spirit of the invention." *Id.*, col. 9, 11. 41-45; *see also id.*, col. 10, 11. 28-30 ("the following disclosed embodiments of flexible members can be integrally incorporated into a portion of the shoe"). Even if the flexible plate is an embodiment of the flexible member or flexible region, both the "member" and "region" are envisioned as being integral with other parts of the shoe in at least some embodiments. *See, e.g., id.*, col. 12, 11. 46-47 ("each of the above-described flexible members may be made integral with the rear sole support"). Thus, the court cannot find that the flexible plate must be a separate and removable component.

Therefore, the term flexible plate should be defined according to its plain and ordinary meaning. The dictionary definition of "plate" as a noun defining a shape is "a smooth usu. nearly flat and relatively thin piece of metal or other material" or "a perfectly flat sheet of material of uniform thickness throughout." Webster's Third New Int'l Dictionary 1734 (1986). Because there is some difference between the two definitions, the court must look to the specification to discern the appropriate choice. Here, the specification discloses several embodiments that are neither perfectly flat nor of uniform thickness. This indicates that the first, more general, definition is the better choice. The dictionary definition of "flexible" is "capable of being flexed," or more specifically, "capable of being turned, bowed, or twisted without breaking." Webster's Third New Int'l Dictionary 869 (1986). Again, the specification indicates that the properties of flexibility, cushioning, and springiness are important to the flexible plate. However, there is no indication that the plate need be capable of being turned or twisted. Akeva's proposed definition uses "bendable," and is otherwise consistent with the dictionary definition.

Thus, the term "flexible plate" should be construed to mean "a smooth, usually nearly flat, and relatively thin piece of metal or other material that is bendable."

3. "Peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a *direction substantially perpendicular* to a major axis of the shoe"

This claim term has been referred to as "relative restraint," and it causes the deflection feature discussed

below.[6] Both parties agree that the first part of this claim term is properly defined according to its plain and ordinary meaning. Akeva proposes a construction for "restrained from movement relative to an interior portion of the plate" as "a plate portion is restrained from movement as compared to a portion that is closer to the center of the plate." (Akeva's Markman Br. at 13.) adidas proposes separate constructions of various components of this phrase: (1) "restrained" should mean "prevented from doing something"; (2) "movement" should mean "change of place or position"; and (3) movement "relative to" should mean movement "of one body or point with respect to another body or point that is regarded as fixed." (adidas' Markman Br. at 14.) There is no substantive difference between the parties' definitions thus far. The parties also agree that "a major axis of the shoe" is the heel-to-toe axis.

The dispute centers on the phrase "in a direction substantially perpendicular." The crux of the disagreement is whether this includes the vertical direction. Akeva argues that this should be construed as "either the horizontal (medial-to-lateral) or vertical directions," while adidas argues it should be construed as only the "medial-to-lateral direction."[7] adidas contends that the term should be limited

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[6] The restraint and deflection terms are connected by the phrase "so that" and should be understood together to mean that the restraint feature functions in a certain manner "so that" the deflection can occur in a certain manner.

[7] In summary, Akeva proposes that this term, in its entirety, be construed to mean "a plate portion is restrained from movement as compared to a portion that is close to the center of the plate in either the horizontal (medial-to-lateral) or vertical directions." adidas proposes that the term mean "the peripheral portions of the flexible plate are prevented from changing their place or position

by the prosecution history because the patent examiner defined the term as the lateral-to-medial direction to distinguish it from a prior art reference and allow the claims.

The court must begin its construction with the plain and ordinary meaning. The dictionary definition of "perpendicular" used as an adjective in this context of a physical direction[8] "being or set at right angles to a given line or plane." Webster's Third New Int'l Dictionary 1684 (1986). adidas points out that the '300 Patent's specification discusses relative restraint only twice. The first statement teaches that "housing 580 acts as a reinforcement for limiting or eliminating lateral movement of the flexible member 560 during use." '300 Patent, col. 11, 11. 20-23. The second statement teaches that "each of the above-described flexible members may be made integral with the rear sole support, which . . . limits the lateral displacement of the periphery of the flexible member upon deflection." *Id.*, col. 12, 11. 47-52. These statements reference only lateral movement, but they do not redefine the restraint term nor do they disclaim or disavow any coverage of other types of movement of the flexible member. Thus, the specification contains no evidence to show the plain and ordinary meaning should be rebutted.

The only portion of the prosecution history before the court is the examiner's Notice of Allowability. In this notice, the examiner stated:

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in the medial to lateral direction with respect to an interior portion of the plate."

[8] The dictionary contains an additional definition of a physical direction related to the horizon and outdoor observation. This definition is inappropriate in the context of a patent over an athletic shoe where a given line is explicitly referenced.

> This language has been interpreted as the restrained direction being the direction perpendicular to the major axis, i.e.[,] the major axis is that axis which runs from the toe of the shoe to the heel of the shoe and *the direction perpendicular to such is the direction medial to lateral direction* and allows the interior portion of the plate to deflect relative to the peripheral portions in the perpendicular/vertical directions, i.e.[,] a direction perpendicular to the major axis.

(adidas' Markman Br. Ex. G. at 2 (emphasis added).) She continued that a prior art reference by Tong did not include this feature, and, in fact, the Tong shoe did not include any restraint of the peripheral portions in the medial-to-lateral direction. (*Id.* at 2-3.) Also, it provided "no guidance as to how the interior of the plate reacted in reference to the periphery of the plate." (*Id.*) The examiner concluded that the Tong reference must feature a plate that moved as a single element, functioned as "a supporting element, not a flexible deflective member," and did not feature any concave or convex sections on its upper surface. (*Id.* at 3.). She also described the Tong reference as having a wave shape that "allowed the plate to expand horizontally/in a direction along the major axis of the shoe, instead of vertically, i.e.[,] 'in a direction substantially perpendicular to a major axis of the shoe' as claimed [in the '300 Patent]." (*Id.*) For these reasons, the '300 Patent overcame the Tong reference.

The doctrine of prosecution history estoppel may limit a claim term where the prosecution history (or "file wrapper") shows the patentee made "express representations . . . to the examiner to induce a patent grant." *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 452 (Fed. Cir. 1985). "Such representations include amendments to the

claims and arguments made to convince the examiner that the claimed invention meets the statutory requirements of novelty, utility, and nonobviousness." *Id.* Statements like this would exclude from the definition of claim terms any subject matter that was "disclaimed or disavowed during prosecution in order to obtain claim allowance." *Id.* Estoppel also results when "arguments made during prosecution . . . show a clear and unmistakable surrender of subject matter." *Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1251 (Fed. Cir. 2000) (internal quotations omitted). However, not all changes will result in estoppel. Changes are often made during a patent's prosecution, and "[a] non-substantive change or a change that did not in fact determine patentability does not create an estoppel." *Pall Corp. v. Micron Separations. Inc.*, 66 F.3d 1211, 1219 (Fed. Cir. 1995). If the examiner relies on a concession or argument to establish patentability over prior art, this "is a substantive position on the technology for which a patent is sought, and will generally generate an estoppel." *Id.* at 1220. On the other hand, "when claim changes or arguments are made in order to more particularly point out the applicant's invention, the purpose is to impart precision, not to overcome prior art." *Id.* In the latter case, no estoppel is presumed and the issue must be examined on its facts. *Id.*

In this case, it does not appear that estoppel is warranted because the examiner was clarifying an aspect of the invention without intending to limit it. She merely describes the features of the Akeva patent that distinguish it from the Tong reference. Whether or not the examiner was relying on an argument made by the patentee to overcome this prior art reference, there is no indication that she amended the claims to conform to a limited interpretation of the direction of relative restraint. Also, there was no need to limit the direction of relative restraint to only the medial-to-lateral

direction in order to establish patentability. If the Tong reference discloses an interior plate that does not feature any relative restraint, as the Notice of Allowability concludes, then the '300 Patent could disclose a plate wherein the periphery and interior moved separately in *any direction*, so long as separate movement was claimed. This would be enough to overcome the Tong reference. Moreover, if the examiner had excluded the vertical direction in regard to relative, restraint, this would create a problem for one of the allowed claims of the '300 Patent. Claim 192 includes a relative restraint feature wherein the plate portion is "restrained from movement in *a substantially vertical direction*." '300 Patent, col. 28, 11. 45-47 (emphasis added). Excluding the vertical direction would render this claim invalid.

Finally, the language of this notice is not clear enough to effect an estoppel. The first reference to the perpendicular direction discusses relative restraint and states "the direction perpendicular to such is the . . . medial to lateral direction." (adidas' Markman Br. Ex. G. at 2.) When the examiner discusses the deflection feature, however, she talks about the vertical direction. For instance, she concludes that the Tong reference's shape "allowed the plate to expand horizontally . . . , instead of *vertically, i.e. [,] 'in a direction substantially perpendicular* to a major axis of the shoe.'" (*Id.* at 3 (emphasis added).) Akeva argued at the Markman hearing that "*a* major axis of the shoe" is used in regard to the direction of relative restraint, while "*the* major axis of the shoe" is used in regard to the direction of deflection. This would mean that the latter comment about the vertical direction is made in reference to relative restraint, even though it appears to discuss deflection. Whether or not Akeva is correct about the examiner's reference, the court is unwilling to find estoppel based on this language.

Prosecution history estoppel is generally only found based on express statements or an unmistakable surrender of subject matter. Without a more direct statement by the examiner or the patentee regarding the meaning of this perpendicular direction, the court cannot find the scope of the term "perpendicular" in reference to the relative restraint term to be limited to the medial-to-lateral direction.

Thus, the term "peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a direction substantially perpendicular to a major axis of the shoe" should be construed as "the peripheral portions of the flexible plate are prevented from changing their place or position as compared to a portion that is close to the center of the plate in any direction that is substantially at a right angle to a heel-to-toe axis of the shoe, including the medial-to-lateral and vertical directions."[9]

4. "The interior portion of the plate is capable of being deflected relative to the peripheral portions in a *direction substantially perpendicular* to the major axis of the shoe"

This claim term is sometimes referred to as the "relative deflection" feature, and it occurs as a result of relative restraint, discussed above.[10] Akeva proposes the following

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[9] This definition does not include restraint in a direction along a heel-to-toe axis of the shoe, or parallel to such axis.

[10] Relative deflection is used in independent claims 93, 117, 118, 121, 122, and 204 and their dependencies. Claim 192 uses different language: "the interior portion of the plate is capable of being deflected relative to at least a portion of the restrained periphery *in a substantially vertical direction*." '300 Patent, col. 28, 11. 47-50 (emphasis added).

definition: "a plate portion can deflect as compared to a portion that is closer to the center of the plate, caused at least in part by the relative restraint." (Akeva's Markman Br. at 13.) adidas proposes that the term be construed as

> the interior portion of the plate is susceptible to undergoing an action wherein the position of the interior portion is changed through normal use from its normal unflexed state (in which the interior portion is elevated relative to the periphery of the plate) into a position in which the interior portion is bent downward with respect to the periphery of the plate.

(adidas' Proposed Cl. Construction Order at 2.) adidas' construction is based, in part, on the plain meaning of "capable" as "constituted, situated, or characterized as being susceptible or open to being affected"; the plain meaning of "deflected" as "curved or turned downward"; the plain meaning of "relative to" as "movement of one body with respect to another that is regarded as fixed." (adidas' Markman Br. at 17-18 (internal quotations omitted).)

adidas argues that "capable of being deflected" cannot take on its plain and ordinary meaning of "susceptible to changing its position to become curved or turned downward" because the specification discusses it in a very specific way. The plate is capable of changing position from a "normal, unflexed state" to a deflected position. The "normal, unflexed state" is one in which the plate's interior is elevated relative to the periphery, or is in a convex (domed) or arched position. This means, adidas contends, that the plate is convex and deflects to a position of concave. Otherwise, if the plate began in a concave shape, it could not be further deflected.

The plain and ordinary meaning of "deflected" as an adjective is "curved or turned downward." Webster's Third New Int'l Dictionary 592 (1986). The idea of "turning" an object would appear more appropriate in the context of the deflection of a projectile or moving object. "Curved" is more appropriate to a stationary object.

The court notes, first, that Akeva's definition is incorrect because the plain meaning of the term should require the center of the plate to deflect compared to the periphery. Plaintiff offers no evidence to refute this construction. adidas' argument that the plate must begin in a convex shape and deflect to a concave shape is also problematic. To begin with, a concave plate made of a flexible material (such as rubber) could be further deflected. More importantly, even if it is true that the specification discloses no other forms in discussing deflection, this would not be enough to warrant limiting the term unless there had also been a redefinition, disclaimer, or disavowal of claim scope with respect to this term. A specification need not discuss all possible embodiments of the invention, and simply because an embodiment is not discussed is not enough to exclude that embodiment from the scope of the invention. *See Liebel-Flarsheim*, 358 F.3d at 906 ("This court has expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment."); *Alloc, Inc. v. ITC*, 342 F.3d 1361, 1370 (Fed. Cir. 2003) ("It is impermissible to read the one and only disclosed embodiment into a claim without other indicia that the patentee so intended to limit the invention."). A disclosure of only one embodiment may only be enough to limit the claim terms if the court can find that the patentee "demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction." *Liebel-Flarsheim*, 358 F.3d at 906

(internal quotations omitted). Here, while it may be true that the specification only discusses a flexible plate that begins in a convex shape and deflects to a concave shape, the specification does not show any clear intent to limit the flexible plate to this shape.

The latter portion of this claim term "in a direction substantially perpendicular to the major axis of the shoe" specifies the direction of deflection. As an initial matter, and although the dictionary definition of "deflected" includes the direction "downward," the court will afford greater weight to the direction specified in the claim term itself. Next, the wording of this portion of the claim term is identical to the wording in the relative restraint term, except that the word "the" precedes "major axis" instead of the word "a." With regard to "in a direction substantially perpendicular," the court must construe this term the same way that it defined it regarding relative restraint. *See Digital Biometrics, Inc. v. Identix, Inc.*, 149 F.3d 1335, 1345 (Fed. Cir. 1998) (noting the rule that "the same word appearing in the same claim should be interpreted consistently"). The parties are in agreement about the meaning of "the major axis of the shoe," as discussed above. Thus, the court must interpret this claim term according to its plain and ordinary meaning.

The relative deflection term will be construed as "the portions of the flexible plate close to the center are able to be curved, as compared to the peripheral portions of the flexible plate, in any direction that is substantially at a right angle to a heel-to-toe axis of the shoe, including the medial-to-lateral and vertical directions."

5. "The upper surface [of the flexible plate] having at least one *concave* portion"

The term at issue here is "concave," and the parties agree that the plain and ordinary meaning of "concave" is "hollowed or rounded inward like the inside of a bowl." They also agree that the plain and ordinary meaning of this term should apply. Akeva asserts, in addition, that this definition only applies when the surface is "viewed from the perspective where the surface is visible," which means that the upper surface of the plate must be viewed from above. The court sees no reason to deviate from the term's ordinary meaning. Neither the claims nor the specification contain any requirement regarding how the flexible plate should be viewed, and the court will not read additional requirements into the term. Akeva argues that adidas' expert views the flexible plate from below, but the court has not considered any expert testimony regarding claim construction. adidas makes note of the absence of any disclosure of a concave upper surface in the '300 Patent's specification, which discusses only convex or arched flexible regions or plates. The failure of the specification to discuss a particular embodiment is not enough to exclude that embodiment from the scope of the claims if the claims would otherwise encompass it. *See CCS Fitness*, 288 F.3d at 1368 ("[Defendant] cannot use the intrinsic evidence's silence to narrow the ordinary meaning of an unambiguous claim term.").

The term "concave" should be construed as "hollowed or rounded inward like the inside of a bowl."

6. "Opening"

adidas argues that the term "opening" must be construed according to its plain and ordinary meaning of "breach or

aperture" because the specification makes no mention of it. Akeva does not propose any claim construction for this term.

To the extent any dispute exists, the term "opening" should be defined as "breach or aperture."

7. "Curve"

Akeva proposes that this term take its plain and ordinary meaning of "a deviation from a straight line or plane surface without sharp breaks or angularity." adidas proposes no construction of its own.

To the extent any dispute exists, the term "curve" should be defined as "a deviation from a straight line or plane surface without sharp breaks or angularity."

D. The 6,662,471 Patent's Disputed Claim Terms

There is only one independent claim in the '471 Patent and 31 dependent claims. Akeva asserts that adidas infringes all of these claims. The first claim discloses the following invention (emphasis added to disputed terms):

1. A shoe comprising:

an upper, and

a rear sole *secured* below a portion of the upper, the rear sole comprising:

a member having a top wall with a lower surface, . . . the member having a bottom wall with an upper surface, . . . the top wall and the bottom wall each having a forward region and a rearward region, the forward regions of the top and bottom walls being connected at a closed end by a curved wall; . . . the rearward regions of the top and bottom walls being *oriented toward a back of the shoe*, . . .;

> at least one *element* positioned between at least a portion of the top wall and at least a portion of the bottom wall, the at least one element having at least one interior sidewall; . . . .

The term "secured" also appears in the '300 Patent and was discussed and defined in the discussion of "secured," above. These additional terms from the '471 Patent are disputed by the parties.

1. "The rearward regions of the top and bottom walls being *oriented toward a back of the shoe*"

adidas argues that the term "oriented toward a back of the shoe" should be construed as "placed at or near the side or surface of the shoe that is opposite the front (toe) of the shoe." It reaches this definition through the dictionary definitions of "back" ("the side or surface of something that is opposite to the side regarded as its front or face"), "orient" ("place in relation to"), and "toward" ("near" or "at a point in the direction of"). adidas claims that this is consistent with the specification's use of the term because in every disclosed embodiment, the rearward regions of the U-shaped member are placed at the back of the shoe. Akeva, in opposition, argues that the referenced rearward regions in the claim need not be physically located at or near the back of the shoe. Plaintiff proposes that the term's construction should stem from the plain and ordinary meaning of "oriented toward": "directed towards or placed in relation to a location at or near the back of the shoe."

The dictionary definition of "oriented" is "directed toward" or "placed in relation to." Webster's Third New Int'l Dictionary 1591 (1986). The definition of "toward" as a preposition is "in the direction of." Webster's Third New

Int'l Dictionary 2417 (1986). adidas has pointed to no compelling evidence suggesting that the plain and ordinary meaning should be rebutted or limited. The plain meaning of the phrase "oriented toward" does not include the requirement that an object that is "oriented toward" something must be placed physically near the thing. It encompasses only the notion that the object be facing a particular direction.

Therefore, the proper construction of "oriented toward a back of the shoe" should be construed as "directed toward or placed in the direction of a location at or near a back of the shoe."

2. "Element"

The parties agree that the ordinary meaning of "element" is "part" or "component" or, as Akeva proposes, "a constituent part." adidas, however, argues this broad definition cannot be used because it does not particularly point out and distinctly claim the subject matter of the invention, and applying ordinary meaning would cause the claim to fail the requirements of 35 U.S.C. § 112 ¶ 2. Because all shoes have parts or components, this would not be enough to let others know what specific kinds of parts were being claimed. adidas also argues that the specification uses the term "element" in a much narrower sense than simply a "part" of the shoe, and the term should be given this more narrow definition. In the written description, this part is described as a "stiffening member[]. . . that may be used to increase the spring generated by the rear sole." *See* '471 Patent, col. 11, 11. 54-57.

Generally, matters of "ambiguity, undue breadth, vagueness, and triviality are matters which go to claim validity for failure to comply with 35 U.S.C. § 112 ¶ 2, not

to interpretation or construction." *Intervet Am., Inc. v. Kee-Vet Laboratories, Inc.*, 887 F.2d 1050, 1053 (Fed. Cir. 1989). However, it is a familiar axiom of patent law that when a claim term is ambiguous, it should be construed to sustain its validity. *Liebel-Flarsheim*, 358 F.3d at 911. This axiom does not apply "unless the court concludes, after applying all the available tools of claim construction, that the claim is still ambiguous." *Id.* A court must look to the intrinsic evidence "to understand the claims *before* their breadth is limited for purposes of preserving validity." *Nazomi Comms., Inc. v. Arm Holdings PLC*, 403 F.3d 1364, 1368-69 (Fed. Cir. 2005) (emphasis added). "Otherwise the construing court has put the validity cart before the claim construction horse." *Id.* at 1369. In analyzing a claim of patent indefiniteness under 35 U.S.C., § 112 ¶ 2, "a court must determine whether those skilled in the art would understand what is claimed when the claim is read in light of the specification." *Bancorp Servs., L.L.C. v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1371 (Fed. Cir. 2004). If a claim term's meaning is discernible, then it is not invalid for indefiniteness. *Id.* Even if a claim is determined to be ambiguous, the court may only construe the claim and may not rewrite it to preserve validity. *Liebel-Flarsheim*, 358 F.3d at 911. A court also may not add limitations from the specification that do not appear in the claim. I, 887 F.2d at 1053.

Although it must be presumed that a claim is valid, 35 U.S.C. § 282, if a claim term is ambiguous, the court may choose the interpretation that preserves validity. A claim term is ambiguous if it is susceptible to more than one interpretation. In Claim 1 of the '471 Patent, the claim term "element" is followed by additional requirements of the object's location between the top and bottom walls and its structure that includes an interior sidewall. While the term is

quite broad, it is not ambiguous because it is susceptible to one interpretation – that of a component or part of the shoe that possesses the additional characteristics listed in the claim. adidas may be correct that this claim term is not sufficiently described to give one skilled in the art a clear idea of what the inventor intended, but it gives enough information to render the term unambiguous, and thus not amenable to added limitations. Any further issues of validity cannot be addressed at this time.

With regard to adidas' second argument, the descriptions in the specification cannot be used to limit this claim term. The language adidas references is an embodiment of the invention that appears to be intended as an example and not as any limitation on the claim's scope.

Therefore, the term "element" should be given its plain and ordinary meaning of "a constituent part."

In conclusion, with the exception of the term "secured" used in both the '300 Patent and the '471 Patent, the disputed terms should be construed according to their plain and ordinary meaning as discussed herein.

III. CONCLUSION

For the reasons set forth above,

IT IS ORDERED that the meaning and scope of the patent claims asserted to be infringed and presented by the parties for construction are determined as set forth in the foregoing Memorandum Opinion.

This the 17th day of May 2005.

William L. Osteen, United States District Judge

Appendix D

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

06-1090

AKEVA L.L.C.,
Plaintiff-Appellant,

v.

ADIDAS-SALOMON AG,
Defendant,

and

ADIDAS AMERICA, INC.,
Defendant-Appellee.

NOTE: This order is nonprecedential.

ORDER

A combined petition for panel rehearing and for rehearing en banc having been filed by the Appellant, and the petition for rehearing, having been referred to the panel that heard the appeal, and thereafter the petition for rehearing en banc having been referred to the circuit judges who are in regular active service,

UPON CONSIDERATION THEREOF, it is

ORDERED that the petition for panel rehearing be, and the same hereby is, DENIED and it is further

ORDERED that the petition for rehearing en banc be, and the same hereby is, DENIED.

The mandate of the court will issue on January 19, 2007.

FOR THE COURT,

Jan Horbaly, Clerk

Dated: 01/12/2007

cc: David F. Meschan

Douglas J. Kline

AKEVA V ADIDAS-SALOMON AG, 2006-1090
(DCT – 1:03-CV-01207)

FILED
U.S. COURT OF APPEALS FOR
THE FEDERAL CIRCUIT
JAN 12 2007
JAN HORBALY
CLERK

Supreme Court, U.S.
FILED
061364 APR 12 2007
OFFICE OF THE CLERK

No. ___

IN THE

Supreme Court of the United States

AKEVA L.L.C.,

Petitioner,

v.

ADIDAS AMERICA, INC.,

Respondent.

On Petition for a Writ of Certiorari to the United States Court of Appeals for the Federal Circuit

PETITIONER'S PATENT APPENDIX

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April 12, 2007

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TABLE OF CONTENTS

Patent Appendix A

U.S. Patent No. 6,604,300 ("'300 Patent") 1a

Patent Appendix B

U.S. Patent No. 6,662,471 ("'471 Patent") 49a

Patent Appendix A

US006604300B2

(12) **United States Patent**
Meschan

(10) **Patent No.: US 6,604,300 B2**
(45) **Date of Patent: *Aug. 12, 2003**

(54) **ATHLETIC SHOE WITH IMPROVED SOLE**

(75) Inventor: **David F. Meschan**, Greensboro, NC (US)

(73) Assignee: Akeva L.L.C., Greensboro, NC (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: 10/007,535

(22) Filed: Dec. 4, 2001

(65) **Prior Publication Data**

US 2002/0116842 A1 Aug. 29, 2002

Related U.S. Application Data

(63) Continuation of application No. 09/641,148, filed on Aug. 17, 2000, now Pat. No. 6,324,772, which is a continuation of application No. 09/512,433, filed on Feb. 25, 2000, now Pat. No. 6,195,916, which is a continuation of application No. 09/313,667, filed on May 18, 1999, now Pat. No. 6,050,002, which is a continuation of application No. 08/723,857, filed on Sep. 30, 1996, now Pat. No. 5,918,384, which is a continuation-in-part of application No. 08/291,945, filed on Aug. 17, 1994, now Pat. No. 5,560,126, which is a continuation-in-part of application No. 08/108,065, filed on Aug. 17, 1993, now Pat. No. 5,615,497.

(51) **Int. Cl.**[7] **A43B 21/32**; A43B 13/48

(52) **U.S. Cl.** ..... **36/25 R**; 36/37; 36/28; 36/27; 36/35 R

(58) **Field of Search** ..... 36/37, 25 R, 15, 36/100, 105, 103, 42, 31, 35 R, 35 B, 27, 28

(56) **References Cited**

U.S. PATENT DOCUMENTS

48,682 A 7/1865 Hayward et al.
221,592 A 11/1879 Mitchell et al.
485,813 A 11/1892 Hooper
537,492 A 4/1895 Smith
652,887 A 7/1900 Butterfield

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

CH	434 029	10/1967
DE	648 339	7/1937
DE	693 394	7/1940
DE	947 054	7/1956
DE	2 154 951	5/1973

(List continued on next page.)

OTHER PUBLICATIONS

Expert Declaration of: Jerry D. Stubblefield dated Jul. 30, 2002

"New Footwear Concepts" by E.I. du Pont de Nemours & Co. (1988).

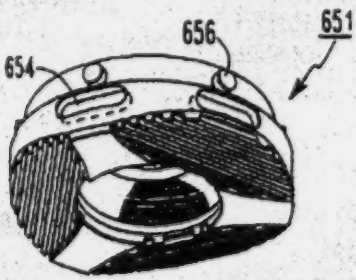
(List continued on next page.)

Primary Examiner—M. D. Patterson
(74) *Attorney, Agent, or Firm*—Martin & Ferraro, LLP

(57) **ABSTRACT**

A shoe has an upper, a foot support region positioned below at least a portion of the upper to support the bottom of a user's foot, a sole secured below the foot support region, and a flexible member positioned below at least a portion of the foot support region and above at least a portion of the sole. The flexible member has a top surface, a bottom surface, a peripheral portion, and an interior portion. The interior portion of the flexible member deflects in use in a direction substantially perpendicular to a major longitudinal axis of the shoe. At least a portion of the peripheral portion is restrained from movement relative to the interior portion in a direction substantially perpendicular to the major longitudinal axis of the shoe.

239 Claims, 27 Drawing Sheets



U.S. PATENT DOCUMENTS

674,636 A 5/1901 Priestman
789,089 A 5/1905 Frank
818,861 A 4/1906 Beck et al.
990,458 A 4/1911 Scholl
1,036,815 A 12/1912 Lavoie
1,062,338 A 5/1913 Kane
1,112,635 A 10/1914 May
1,316,505 A 5/1919 O'Neill
1,318,247 A 10/1919 Victor
1,346,841 A 7/1920 Padden
1,366,601 A 1/1921 Sellars
1,371,339 A 3/1921 Arntz et al.
1,410,064 A 3/1922 Hunt
1,439,757 A 12/1922 Redman
1,439,758 A 12/1922 Redman
1,444,677 A 2/1923 Fischer
1,458,257 A 6/1923 Van Melle
1,479,773 A 1/1924 Craig
1,501,765 A 7/1924 Freese
1,516,384 A 11/1924 Kamada
1,542,174 A 6/1925 Robideux
1,611,024 A 12/1926 Grimaldi
1,721,714 A 7/1929 Ross
1,811,641 A 6/1931 Marcelle
2,002,087 A 5/1935 Esterson
2,003,646 A 6/1935 De Blasio
2,087,311 A 4/1937 Boag
2,119,807 A 6/1938 Farley
2,148,974 A 2/1939 Wysowski
2,208,260 A 7/1940 Hayden
2,288,168 A 6/1942 Leu
2,300,635 A 11/1942 Shepherd
2,374,954 A 5/1945 Papitone
2,446,627 A 8/1948 Hier
2,491,280 A 12/1949 Roth
2,501,302 A 3/1950 Vicente
2,540,489 A 2/1951 Kaufmann
2,556,842 A 6/1951 Gilmour
2,617,134 A 8/1952 Langer
2,628,439 A 2/1953 Kochlin
2,707,341 A 5/1955 Romano
2,745,197 A 5/1956 Holt
2,806,302 A 9/1957 Sharpe
2,998,561 A 9/1961 Isacal
3,083,478 A 4/1963 Rakus
3,085,359 A 4/1963 Rubens
3,087,265 A 4/1963 McKinley
3,169,327 A 2/1965 Fukuoka
3,171,218 A 3/1965 D'Urbano
3,208,163 A 9/1965 Rubens
3,237,321 A 3/1966 McKinley
3,271,885 A 9/1966 McAuliffe
3,318,025 A 5/1967 Antelo
3,455,038 A 7/1969 Kaslan
3,478,447 A 11/1969 Gilead
3,514,879 A 6/1970 Frattallone
3,566,489 A 3/1971 Morley
3,593,436 A 7/1971 Victas
3,646,492 A 2/1972 Gilkin
3,664,041 A 5/1972 Frattallone
3,775,874 A 12/1973 Bonneville
3,782,010 A 1/1974 Frattallone
3,804,099 A 4/1974 Hall
3,928,881 A 12/1975 Heate
3,968,840 A 11/1976 Minihane
4,043,068 A 8/1977 Hollister et al.
4,062,132 A 12/1977 Klimaszewski
4,067,123 A 1/1978 Minihane
4,098,011 A 7/1978 Bowerman
4,102,061 A 7/1978 Saarinen
4,168,585 A 9/1979 Gleichner
4,214,386 A 7/1980 Gonzalez
4,224,749 A 9/1980 Diaz-Cano
4,258,480 A 3/1981 Famolare, Jr.
4,262,434 A 4/1981 Micheletti
4,263,728 A 4/1981 Trecentese
4,267,650 A 5/1981 Bauer
4,288,929 A 9/1981 Norton et al.
4,320,586 A 3/1982 Sottolano
4,322,894 A 4/1982 Dykes
4,322,895 A 4/1982 Hackerson
4,342,158 A 8/1982 McMahon et al.
4,363,177 A 12/1982 Horos
4,372,058 A 2/1983 Stubblefield
4,377,042 A 3/1983 Bauer
4,378,643 A 4/1983 Johnson
4,391,048 A 7/1983 Lutz
4,393,605 A 7/1983 Spreng
4,414,763 A 11/1983 Heate
4,429,474 A 2/1984 Metro
4,449,307 A 5/1984 Stubblefield
4,455,765 A 6/1984 Sjoward
4,455,766 A 6/1984 Rubens
4,486,964 A 12/1984 Ruby
4,510,700 A 4/1985 Brown
4,530,173 A 7/1985 Jesinsky, Jr.
4,534,124 A 8/1985 Schnell
4,541,185 A 9/1985 Chou
4,546,556 A 10/1985 Stubblefield
4,550,510 A 11/1985 Stubblefield
4,561,195 A 12/1985 Onoda et al.
4,598,487 A 7/1986 Miscvich
4,606,139 A 8/1986 Silver
4,608,768 A 9/1986 Cavanagh
4,610,100 A 9/1986 Rhodes
4,622,764 A 11/1986 Boulet
4,638,575 A 1/1987 Illustrato
4,642,917 A 2/1987 Ungar
4,680,876 A 7/1987 Peng
4,706,392 A 11/1987 Yang
4,709,489 A 12/1987 Welter
4,712,314 A 12/1987 Sigeloff
4,741,114 A 5/1988 Stubblefield
4,745,693 A 5/1988 Brown
4,756,095 A 7/1988 Takic
4,776,109 A 10/1988 Sacre
4,778,717 A 10/1988 Fitchmun
4,785,557 A 11/1988 Kelley et al.
4,811,500 A 3/1989 Marcano
4,815,221 A 3/1989 Diaz
4,843,737 A 7/1989 Vonderer
4,845,863 A 7/1989 Yung-Mao
4,866,861 A 9/1989 Noone
4,875,300 A 10/1989 Kazz
4,878,300 A 11/1989 Bogaty
4,879,821 A 11/1989 Graham et al.
4,881,329 A 11/1989 Crowley
4,887,367 A 12/1989 Mackness et al.
4,936,028 A 6/1990 Posacki
4,979,319 A 12/1990 Hayes
4,995,173 A 2/1991 Spier
5,005,300 A 4/1991 Diaz et al.
5,014,449 A 5/1991 Richard et al.
RE33,648 F 7/1991 Brown
5,052,130 A 10/1991 Barry et al.
5,070,629 A 12/1991 Graham et al.
5,083,385 A 1/1992 Halford
5,086,574 A 2/1992 Bacchiocchi
5,092,060 A 3/1992 Frackey et al.
5,170,791 A 1/1993 Lair
5,185,943 A 2/1993 Tong et al.

5,191,727	A	3/1993	Barry et al.
5,197,206	A	3/1993	Shorten
5,224,277	A	7/1993	Sang Do
5,255,451	A	10/1993	Tong et al.
5,319,866	A	6/1994	Foley et al.
5,325,611	A	7/1994	Dyer et al.
5,343,639	A	9/1994	Kilgore et al.
5,353,523	A	10/1994	Kilgore et al.
5,367,792	A	11/1994	Richard et al.
5,381,608	A	1/1995	Claveria
5,402,588	A	4/1995	Graham et al.
5,425,184	A	6/1995	Lyden et al.
5,469,638	A	11/1995	Crawford, III
5,528,842	A	6/1996	Ricci et al.
5,560,126	A	10/1996	Meschan et al.
5,615,497	A	4/1997	Meschan
5,722,186	A	3/1998	Brown
5,806,210	A	9/1998	Meschan
5,829,172	A	11/1998	Kaneko

FOREIGN PATENT DOCUMENTS

DE	2 742 138	3/1979
FR	533 972	3/1922
GB	25 728	11/1909
GB	63342	2/1911
GB	83 342	2/1911
GB	229 884	3/1924
GB	1 540 926	2/1979
GB	2 144 024	2/1985
JP	62-41601	10/1987
JP	62-200904	12/1987
JP	5-18965	5/1993

OTHER PUBLICATIONS

Etoni Spring 1996 Footwear catalogue.

International Search Report for International Application PCT/US94/09001 dated Jan. 2, 1995.

Mizuno Sport Shoe Catalog (1986).

Etonic Spring Sport Shoe Catalog; p. 4; (1993).

Declaration of Takaya Kimura (Civil Action File No. 1:00 CV 00978).

Mizuno 1985 Sports Shoe catalog excerpts (MIZJP 0254–02531).

Mizuno 1986 Sports Shoe catalog excerpts (MIZJP 02532–02537).

Mizuno 1987 Athletic Footwear catalog excerpts (MIZJP 02538–02546).

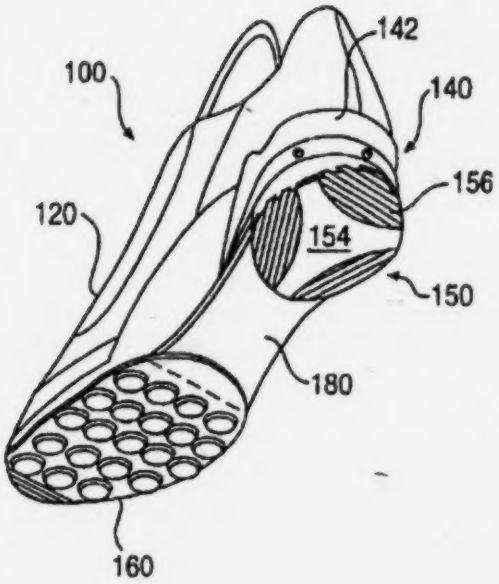
Mizuno 1988 Athletic Footwear catalog excerpts (MIZJP 02547–02549).

Mizuno 1991 All Line–Up catalog excerpts (MIZJP 02550–02556).

Mizuno 1992 Run–Bird All Line–Up catalog excerpts (MIZJP 02557–02559).

Mizuno 1993 All–Line–Up catalog excerpts (MIZJP 02560–02564).

U.S. Patent Aug. 12, 2003 Sheet 1 of 27 US 6,604,300 B2



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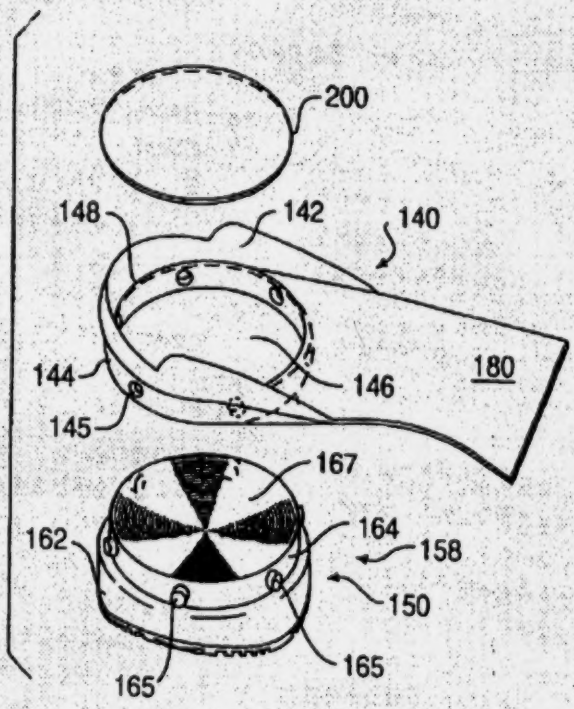

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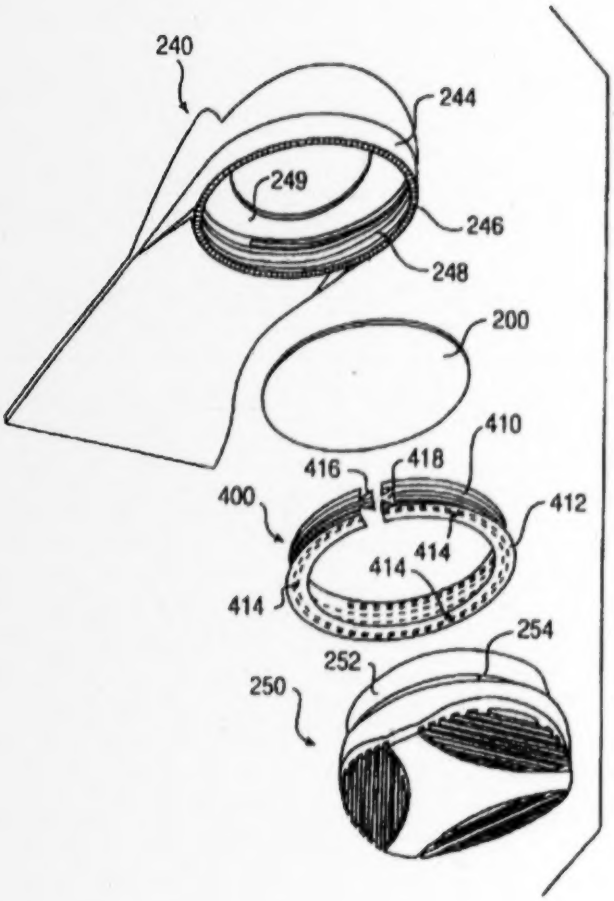
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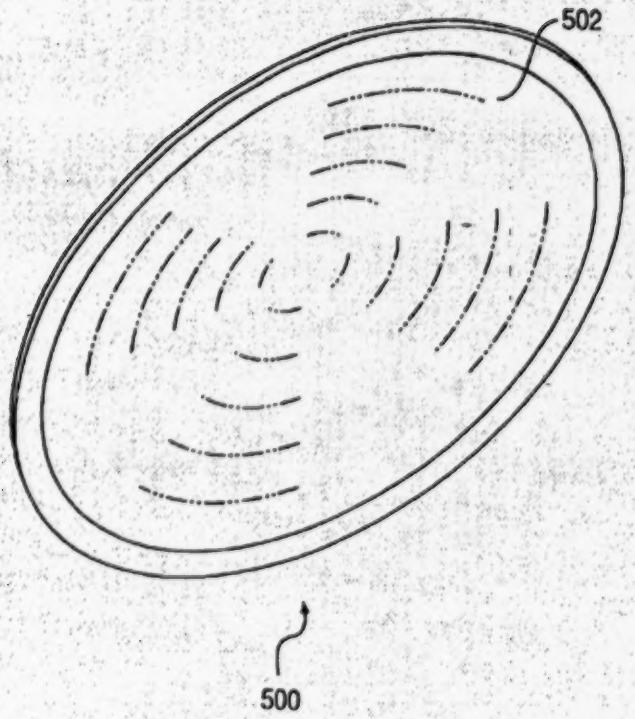

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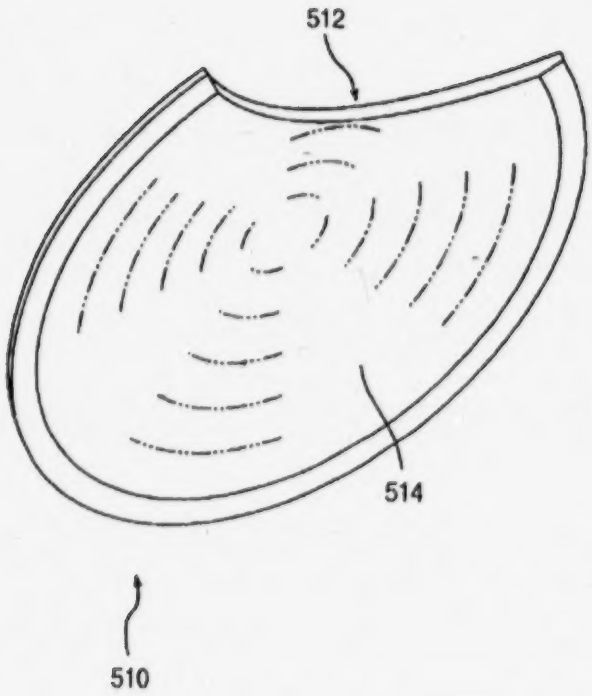

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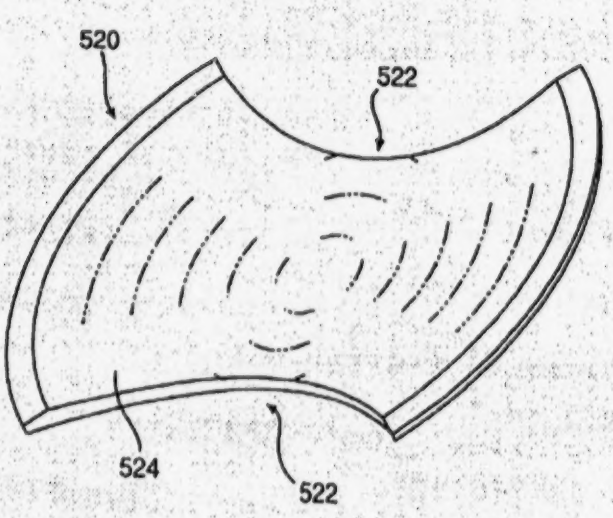


FIG. 6

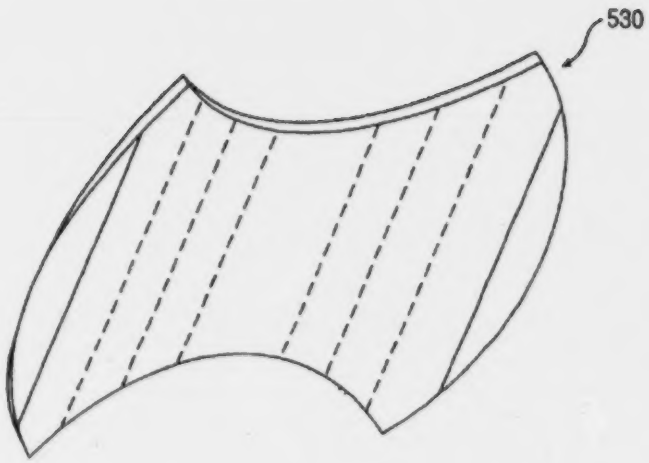


FIG. 7

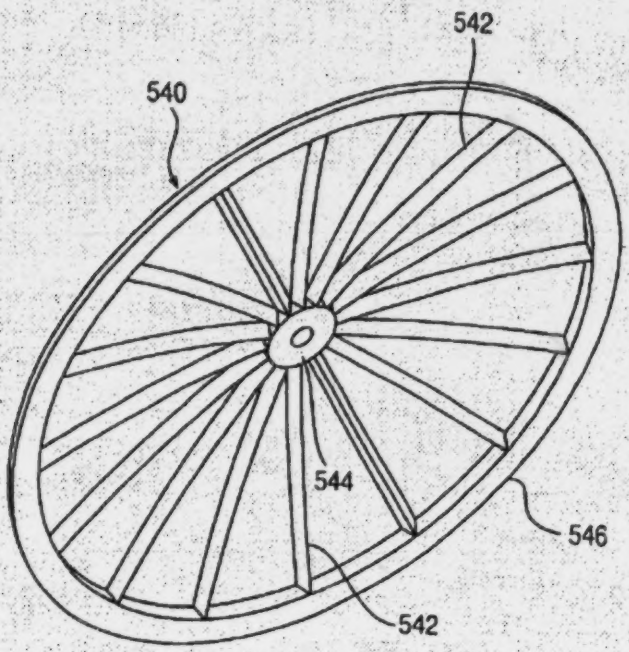


FIG. 8

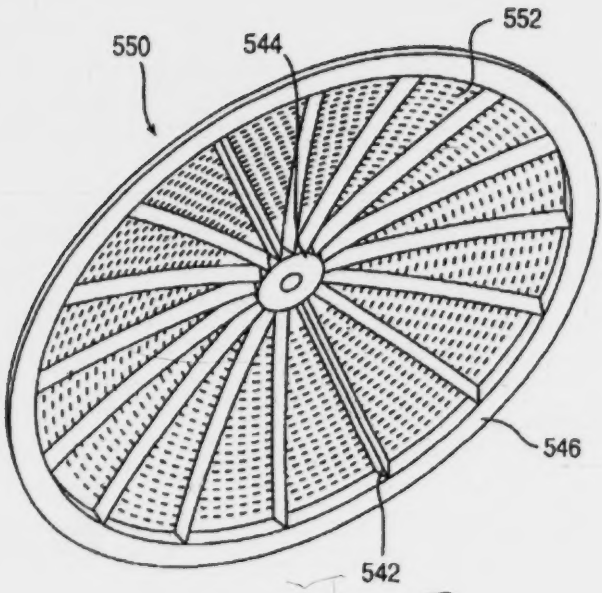


FIG. 9

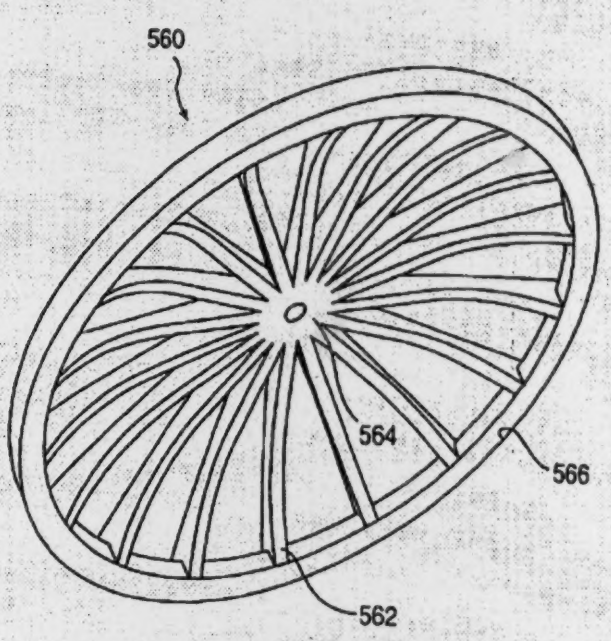


FIG. 10

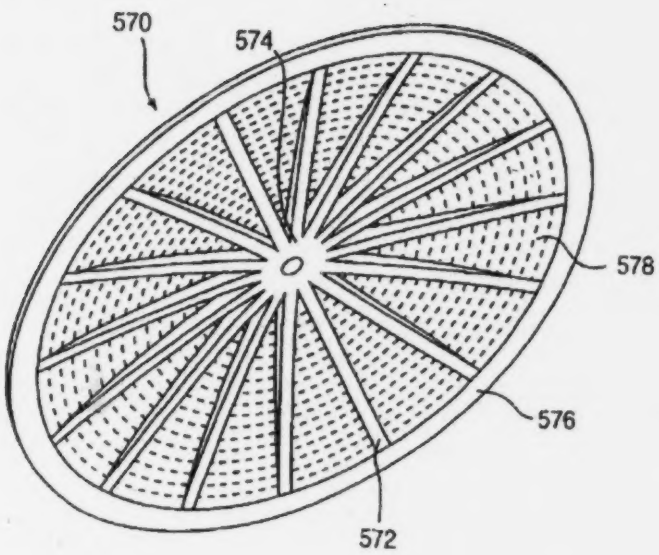


FIG. 11

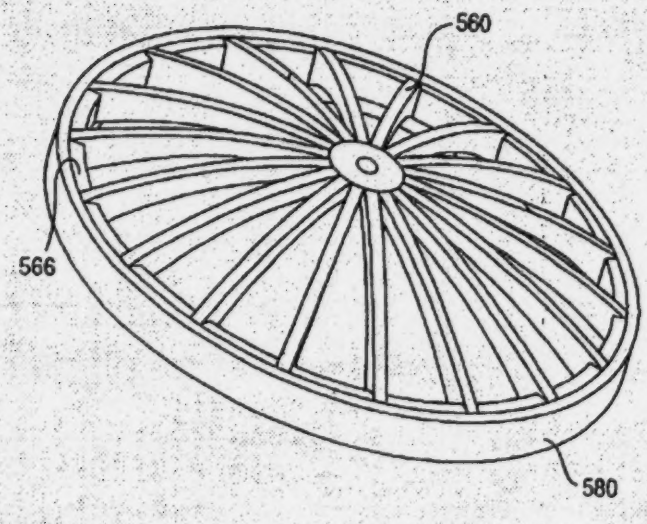


FIG. 12

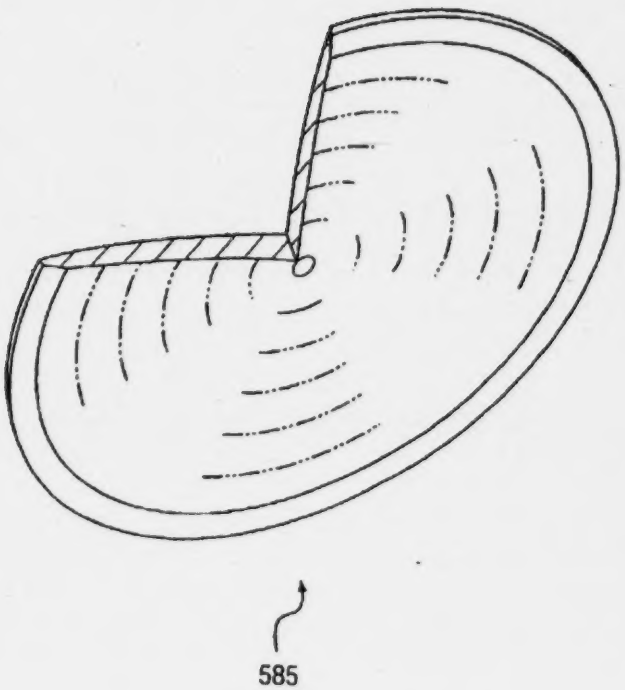


FIG. 13

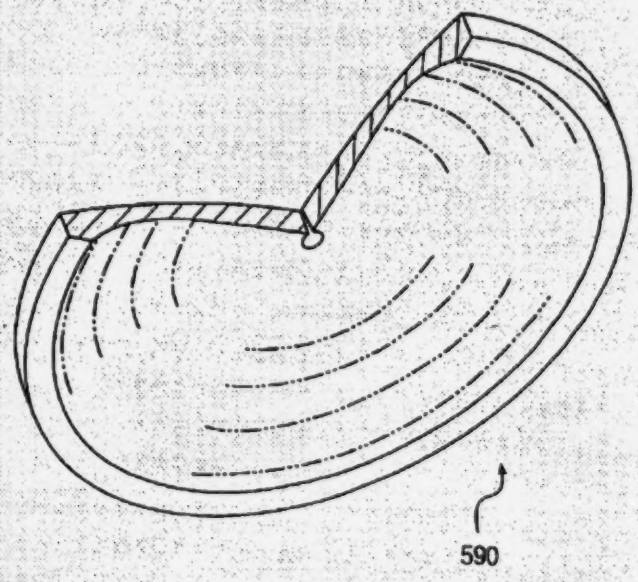


FIG. 14

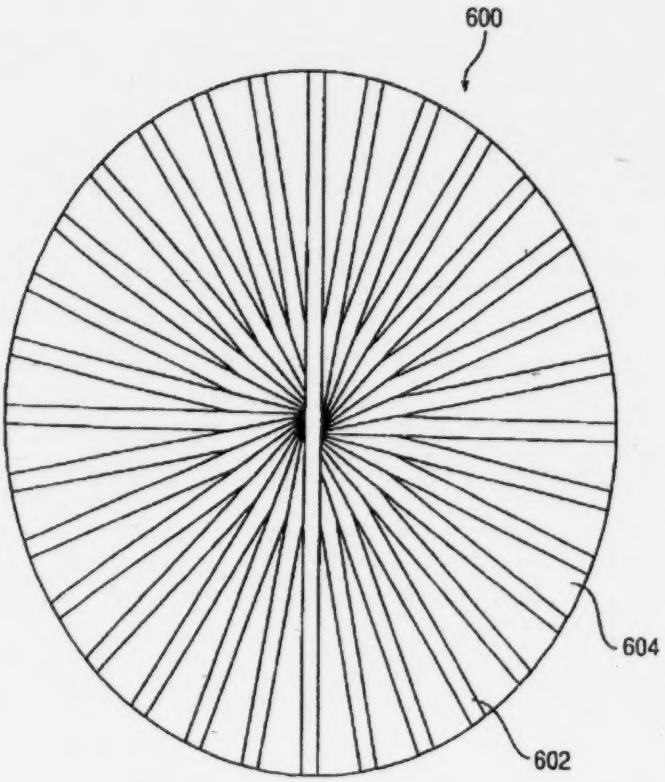


FIG. 15

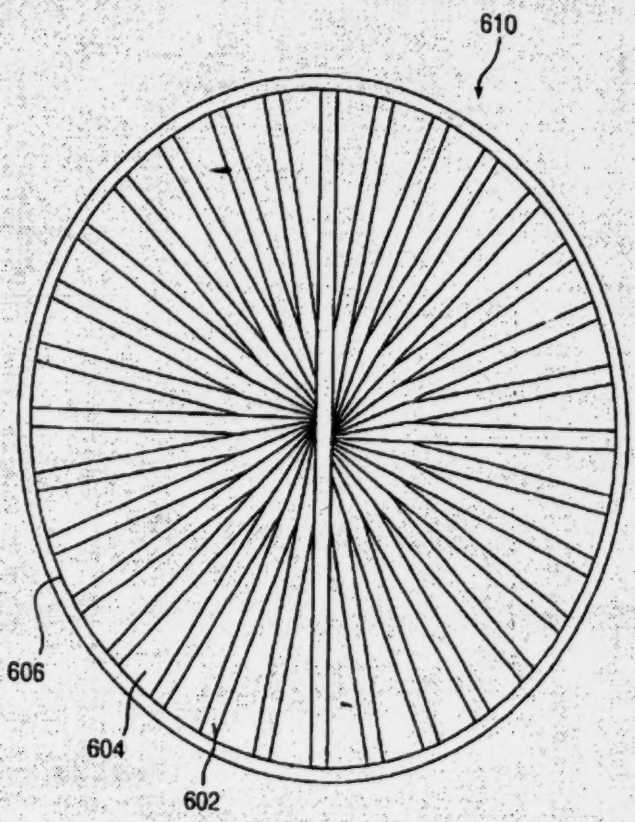


FIG. 16

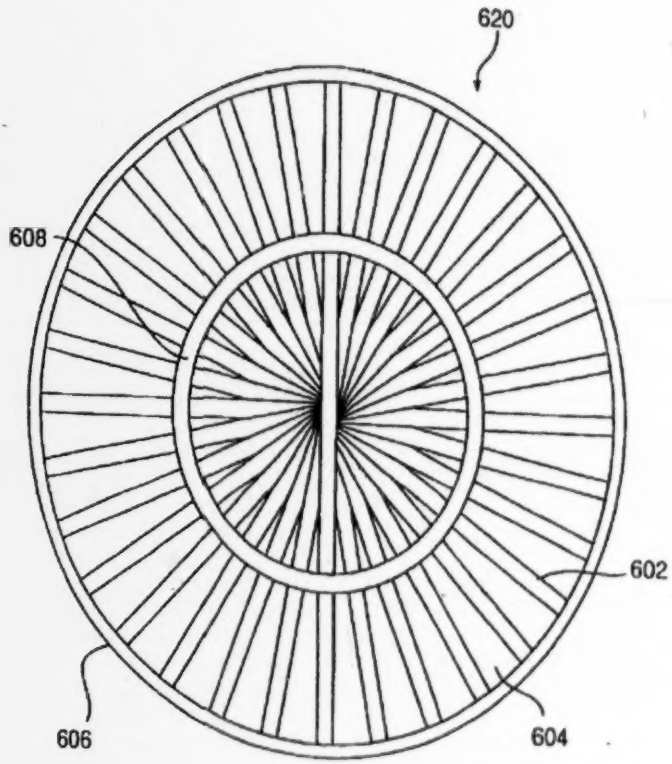


FIG. 17

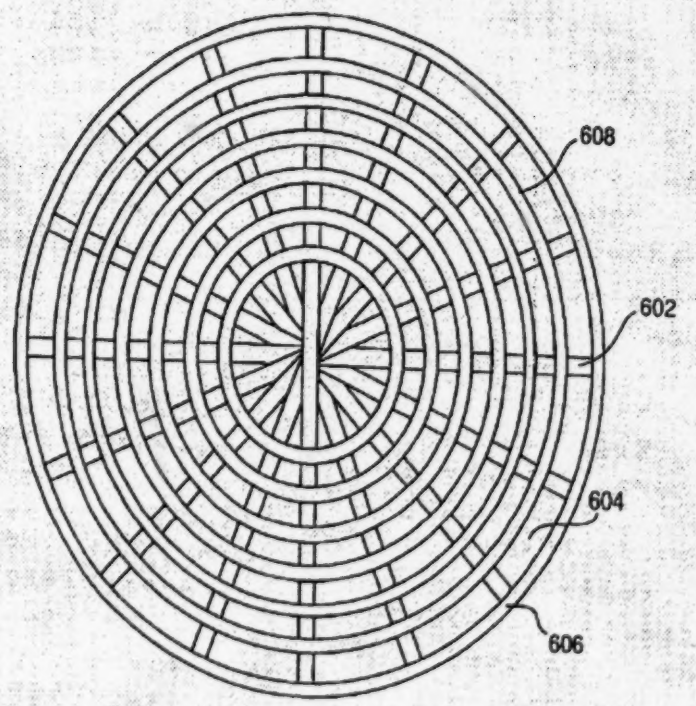


FIG. 17A

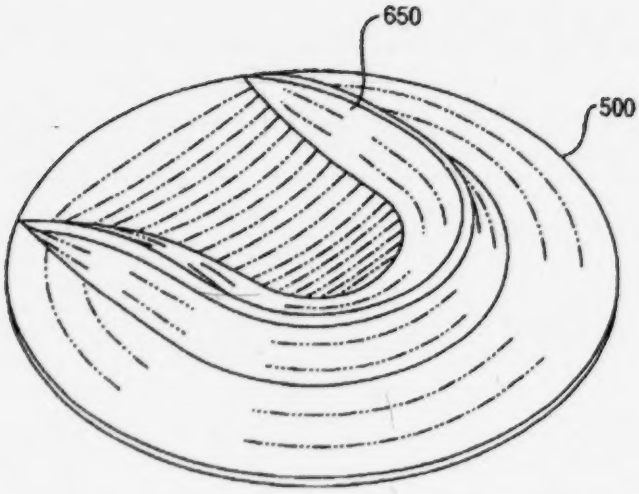


FIG. 18

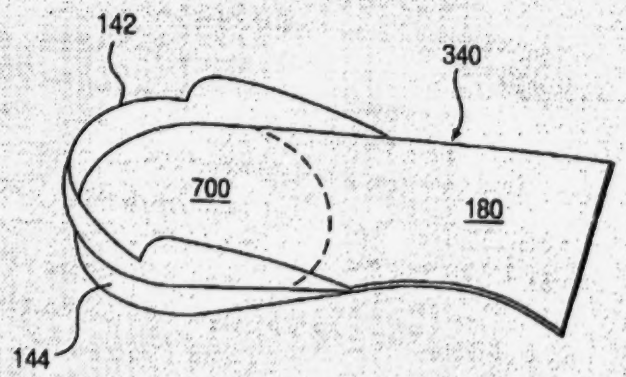


FIG. 19

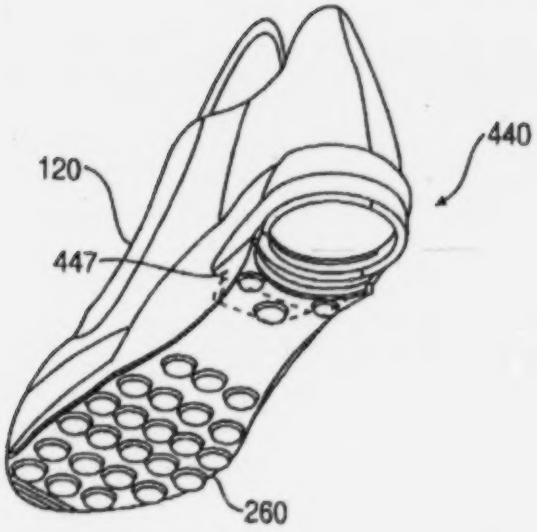


FIG. 20

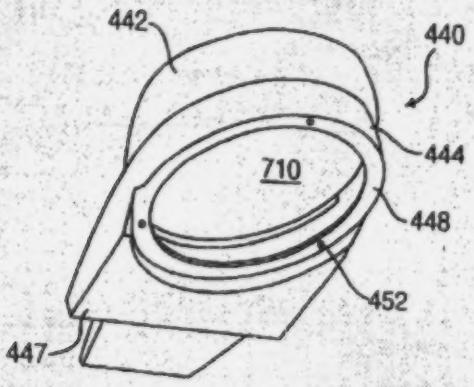


FIG. 21

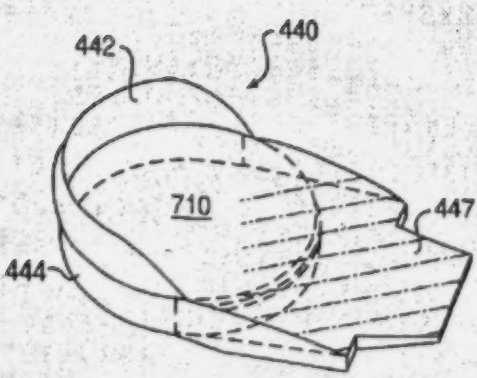


FIG. 22

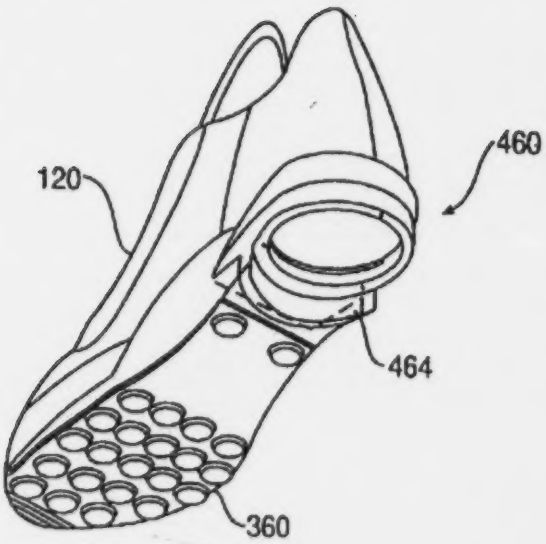


FIG. 23

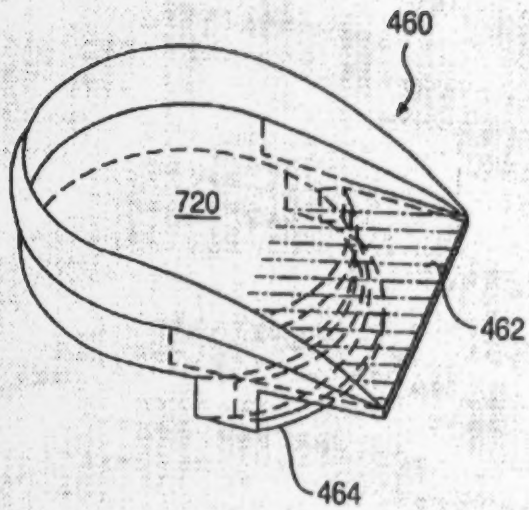


FIG. 24

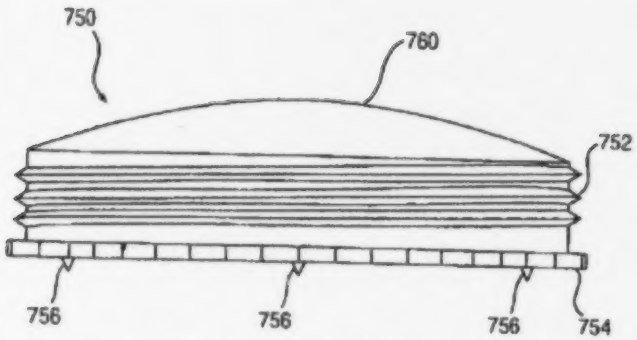


FIG. 25

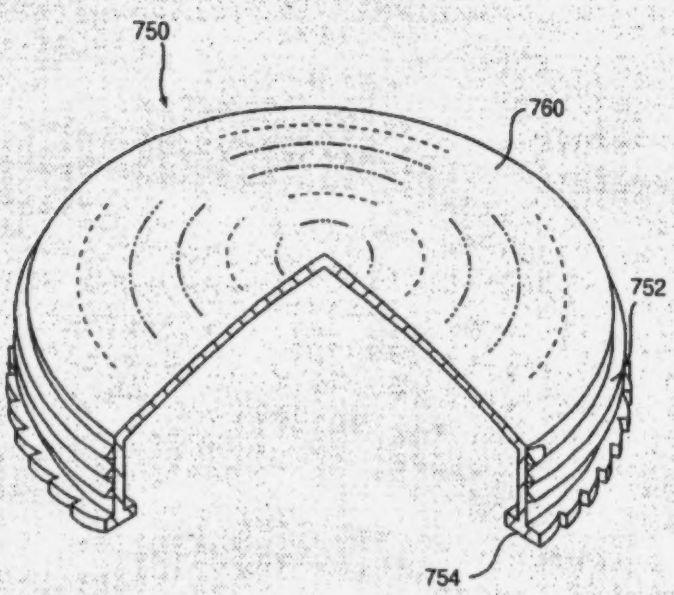


FIG. 26

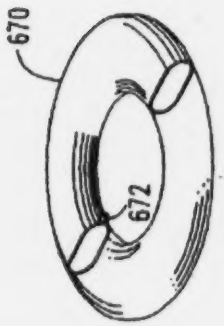


FIG. 28

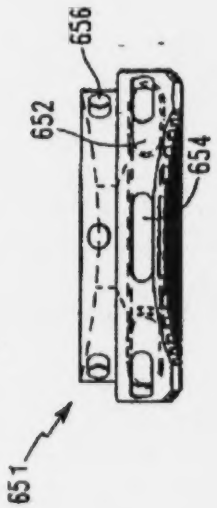


FIG. 29

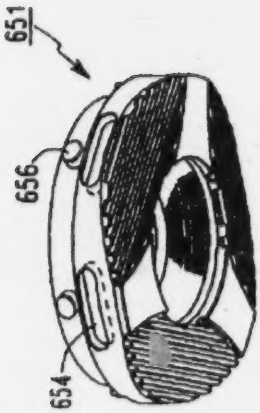


FIG. 27

ATHLETIC SHOE WITH IMPROVED SOLE

This is a continuation of application Ser. No. 09/641,148, filed Aug. 17, 2000, now U.S Pat. No. 6,324,772, which is a continuation of application Ser. No. 09/512,433, filed Feb. 25, 2000, now U.S. Pat. No. 6,195,916, which is a continuation of application Ser No. 09/313,667, filed May 18, 1999, now U.S. Pat. No. 6,050,002, which is a continuation of application Ser. No. 08/723,857, filed Sep. 30, 1996, now U.S. Pat. No. 5,918,384, which is a CIP of 08/291,945, filed Aug. 17, 1994, now U.S. Pat. No. 5,560,126, which is a CIP of 08/108,065, filed Aug. 17, 1993, now U.S. Pat. No. 5,615,497; all of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to an improved rear sole for footwear and, more particularly, to a rear sole for an athletic shoe with an extended and more versatile life and better performance in terms of cushioning and spring.

2. Discussion of the Related Art

Athletic shoes, such as those designed for running, tennis, basketball, cross-training, hiking, walking, and other forms of exercise, typically include a laminated sole attached to a soft and pliable upper. The laminated sole generally includes a resilient rubber outsole attached to a more resilient midsole usually made of polyurethane, ethylene vinyl acetate (EVA), or a rubber compound. When laminated, the sole is attached to the upper as a one-piece structure, with the rear sole being integral with the forward sole.

One of the principal problems associated with athletic shoes is outsole wear. A user rarely has a choice of running surfaces, and asphalt and other abrasive surfaces take a tremendous toll on the outsole. This problem is exacerbated by the fact that most pronounced outsole wear, on running shoes in particular, occurs principally in two places: the outer periphery of the heel and the ball of the foot, with peripheral heel wear being, by far, a more acute problem. In fact, the heel typically wears out much faster than the rest of a running shoe, thus requiring replacement of the entire shoe even though the bulk of the shoe is still in satisfactory condition.

Midsole compression, particularly in the case of athletic shoes, is another acute problem. As previously noted, the midsole is generally made of a resilient material to provide cushioning for the user. However, after repeated use, the midsole becomes compressed due to the large forces exerted on it, thereby causing it to lose its cushioning effect. Midsole compression is the worst in the heel area, including the area directly under the user's heel bone and the area directly above the peripheral outsole wear spot.

Despite technological advancements in recent years in midsole design and construction, the benefits of such advancements can still be largely negated, particularly in the heel area, by two months of regular use. The problems become costly for the user since athletic shoes are becoming more expensive each year, with some top-of-the-line models priced at over $150.00 a pair. By contrast, with dress shoes, whose heels can be replaced at nominal cost over and over again, the heel area (midsole and outsole) of conventional athletic shoes cannot be. To date, there is nothing in the art that successfully addresses the problem of midsole compression in athletic shoes, and this problem remains especially severe in the heel area of such shoes.

Another problem is that purchasers of conventional athletic shoes cannot customize the cushioning or spring in the heel of a shoe to their own body weight, personal preference, or need. They are "stuck" with whatever a manufacturer happens to provide in their shoe size.

Finally, there appear to be relatively few, if any, footwear options available to those persons suffering from foot or leg irregularities, foot or leg injuries, and legs of different lengths, among other things, where there is a need for the left and right rear soles to be of a different height and/or different cushioning or spring properties. Presently, such options appear to include only custom-made shoes that are prohibitively expensive and rendered useless if the person's condition improves or deteriorates.

SUMMARY OF THE INVENTION

The present invention is directed to a shoe that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by practice of the invention. The objectives and other advantages of the invention will be realized and attained by the shoes and shoe systems particularly pointed out in the written description and claims, as well as the appended drawings.

To achieve these and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, the shoe includes an upper having a heel region, a rear sole secured below the heel region of the upper, and a rear sole support attached to the upper and configured to secure the rear sole below the heel region of the upper. The rear sole support includes a flexible region positioned below the heel region of the upper and above a portion of the rear sole. The flexible region is sufficiently stiff to support a user while still being sufficiently flexible to flex and spring when the user runs or walks vigorously. The flexible region has an interior portion which in its normal, unflexed state is spaced upwardly from the portion of thy rear sole immediately below said interior portion, the interior portion being adapted to flex in a direction substantially perpendicular to the major longitudinal axis of the shoe as it is used.

The interior portion of the flexible region preferably is elevated relative to its peripheral portion in a direction toward the heel region of the upper. In certain embodiments the flexible region is an integral part of the rear sole support. The rear sole support may include an integral arch extension extending below the upper from a position proximate the heel region of the upper through a substantial portion of the arch region of the upper to support the arch region.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate several embodiments of the invention and together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of an embodiment of the shoe of the present invention.

FIG. 2 is an exploded isometric view of a rear sole support, flexible member, and rear sole for the shoe of FIG. 1.

FIG. **3** is an exploded isometric view of another embodiment of a rear sole support, flexible member, and rear sole for use in the shoe of the present invention.

FIGS. **4-18** are isometric views of exemplary flexible member embodiments for use in the shoe of the present invention.

FIG. **19** is an isometric view of another embodiment of a rear sole support for use in the shoe of the present invention.

FIG. **20** is an isometric view of another embodiment of the shoe of the present invention.

FIGS. **21** and **22** are isometric views of a rear sole support for the shoe of FIG. **20**.

FIG. **23** is an isometric view of another embodiment of the shoe of the present invention.

FIG. **24** is an isometric view of a rear sole support for the shoe of FIG. **23**.

FIG. **25** is a side elevation view of a securing member for use in the shoe of the present invention.

FIG. **26** is a partial cut-away isometric view of the securing member of FIG. **25**.

FIGS. **27-29** are views of a rear sole for use in the shoe of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the present preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference characters will be used throughout the drawings to refer to the same or like parts.

FIG. **1** illustrates a first embodiment of the shoe of the present invention. The shoe, designated generally as **100**, has a shoe upper **120**, rear sole support **140**, a rear sole **150**, and a forward sole **160**. Shoe **100** also preferably includes a flexible member **200** (FIG. 2) positioned between rear sole **150** and a heel region of upper **120**. The flexible member provides spring to the user's gait cycle upon heel strike and reduces or eliminates interior rear midsole compression in that it is more durable than conventional midsole material.

Upper **120** may be composed of a soft, pliable material that covers the top and sides of the user's foot during use. Leather, nylon, and other synthetics are examples of the various types of materials known in the art for shoe uppers. The particular construction of the upper is not critical to the shoe of the present invention. It may even be constructed as a sandal or may be made of molded plastic, integral with the rear sole support, as in the case of ski boots or roller blade uppers.

Forward sole **160** is attached to upper **120** in a conventional manner, typically by injection molding, stitching, or gluing. Forward sole **160** typically includes two layers: an elastomeric midsole laminated to an abrasion-resistant outsole. The particular construction of the forward sole is not critical to the invention and various configurations may be used. For example, the midsole may be composed of material such as polyurethane or ethylene vinyl acetate (EVA) and may include air bladders or gel-filled tubes encased therein, and the outsole may be composed of, by means of example only, an abrasion-resistant rubber compound.

Rear sole support **140** is also attached to the heel region of upper **120** in a conventional manner, such as injection molding, stitching, or gluing. Rear sole support **140** is substantially rigid and is configured to stabilize the heel region of upper **120** and secure rear sole **150** below the heel

region. As shown in FIG. **2**, rear sole support **140** may include an upwardly extending wall **142**, referred to as a heel counter, that surrounds the periphery of the heel region of upper **120** to provide lateral stabilization. Wall **142** preferably surrounds the rear and sides of upper **120** proximate the heel region and in service supports and stabilizes the user's heel as he or she runs. Rear sole support **140** also includes a downwardly extending side wall **144** that defines a recess **146** sized to receive a portion of rear sole **150**, preferably a rear sole which is removable and rotatable to several predetermined positions. Wall **144** shown in FIG. **2** is generally circular and securely contains and holds rear sole **150**. A plurality of openings **145** is formed in wall **144** to facilitate securement of rear sole **150** to rear sole support **140**. The components of rear sole support **140** are preferably made integral through injection molding or other conventional techniques and are preferably composed of plastic, such as a durable plastic manufactured under the name PEBAX. It is further contemplated that the rear sole support can be made from a variety of materials, including without limitation other injection-molded thermoplastic engineering resins.

As shown in FIGS. **1** and **2**, rear sole support **140** may include an arch extension or support **180** to provide a firm support for the arch of the foot and to alleviate potential gapping problems where sole support wall **144** would be adjacent forward sole **160**. Arch extension **180** generally extends below upper **120** from the forward portion of side wall **144**, through the arch region. It may extend as far as the ball of the foot. It is attached to upper **120** and forward sole **160** by gluing or other conventional methods. Arch extension **180** may be composed of the same material as the rear sole support and made integral with rear sole support **140** by injection molding. Alternatively, it may be made of the same or a different stiff but flexible material (such as carbon or fiberglass ribbons in a resin binder) and glued to rear sole support **140**. Such one-piece construction of the arch extension together with the rear sole support solves another major problem, namely the tendency of an athletic shoe of conventional resilient material in the arch area to curl at the juncture of the substantially rigid rear sole support with the resilient forward sole.

Shoe **100** also includes a rear sole **150** that is detachably secured to and/or rotatably positionable relative to rear sole support **140**. Rear sole **150**, as shown in FIG. **1**, includes a rubber ground-engaging outsole **154** containing a planar area and three beveled segments or portions that soften heel strike during use. As shown, the beveled segments or portions formed on the outsole have the same shape and configuration and are positioned symmetrically about the periphery of the outsole and preferably symmetrically positioned about the center of rear sole **150**. As explained in more detail, rear sole **150** and the attachment features that permit rear sole **150** to be placed and locked into different positions relative to rear sole support **140** are designed and configured so that one symmetrically located beveled portion can be moved into the position previously occupied by another beveled portion. As a result, as one of the beveled portions begins to wear, rear sole **150** can be repositioned to place an unworn beveled portion in the area of the shoe where there is greater wear for a particular user. By periodically altering the position of the sole before any beveled portion is badly worn, (or any midsole material directly above the bevel is badly compressed) the life and effectiveness of the rear sole, and the entire shoe, can be significantly increased. Moreover, after a given rear sole wears beyond its point of usefulness, it can be replaced with a new sole with

the same or different characteristics. Prior to replacement, it is also possible that left and right rear soles may be exchanged with each other inasmuch as left and right rear soles often exhibit opposite wear patterns.

As shown in FIG. 2, rear sole **150** also includes a midsole **158** laminated to outsole **154**. Midsole **158** includes a substantially cylindrical lower portion **162** and a substantially cylindrical upper portion **164** that is smaller in diameter than lower portion **162**. Upper portion **164** includes a plurality of resilient knobs **165** that mate with openings **145** in rear sole support **140**. As shown, the resilient knobs **165** and openings **145** are symmetrically positioned about the central axis of midsole **158** and the recess of rear sole support **140**, respectively. To secure rear sole **150** to rear sole support **140**, rear sole **150** is simply press-fitted into recess **146** until knobs **165** engage corresponding openings **145**. This manner of locking rear sole **150** into the shoe at any one of several positions is one of several mechanical ways in which the rear sole can be removed, repositioned, and/or locked to the rear sole support or other part of a shoe.

In the embodiment shown in FIG. 2, upper midsole portion **164** has a diameter at least equal to and preferably slightly larger than that of the recess into which it fits. Midsole portion **162** has a diameter substantially equal to the diameter defined by the exterior portion of circular wall **144**. This configuration of elements eliminates any vertical gapping problems from occurring between the wall of the rear sole support and the peripheral surface of the rear sole.

The inside diameter of a circular recess **146**, as measured between the inside surfaces of its sidewalls, or the distance between the inside surface of a medial sidewall and the inside surface of an opposite lateral sidewall in the case of a non-circular recess (not shown), may actually be greater than the width of the heel region of the shoe upper as measured from the exterior surface of the medial side of the heel region of the upper to the exterior surface of the lateral side of the heel region of the upper (i.e., the heel region of the upper at its widest point). This is possible because the material used to make the rear sole support **140** and side walls is sufficiently strong and durable to permit the side walls to "flare out" to a greater width than the heel region of the upper without risk of breakage. This in turn permits the use of a larger rear sole **150** with more ground-engaging surface and, hence, more stability. (As stated, the exterior walls of the lower portion of the rear sole generally align vertically with the exterior surface of the side walls forming the recess **146**). It also permits the employment of a flexible region or member with a correspondingly larger diameter, width or length because its peripheral edges optimally should align vertically with the load-bearing side walls of the recess. Such a larger flexible region or member, with a diameter, width or length greater than the width of the heel region of the upper at its widest point, creates more cushioning and/or spring for the user's heel during the gait cycle. The observations and provisions contained in this paragraph are equally applicable to the embodiments described in FIGS. 1, 2, and 3.

Rear sole **150** is preferably made from two different materials: an abrasion-resistant rubber compound for ground-engaging outsole **154**; and a softer, more elastomeric material such as polyurethane or ethylene vinyl acetate (EVA) for midsole **158**. However, rear sole **150** could be comprised of a single homogenous material, or two materials (e.g., EVA enveloped by hard rubber), as well as a material comprising air encapsulating tubes, for example, as disclosed in U.S. Pat. No. 5,005,300. For each of the discussed rear sole embodiments, the outsole and midsole materials are preferably more resilient than materials used for the rear sole support or arch extension.

Detachability of rear sole **150** allows the user to change rear soles entirely when either the sole is worn to a significant degree or the user desires a different sole for desired performance characteristics for specific athletic endeavors or playing surfaces. The user can rotate the rear sole to relocate a worn section to a less critical area of the sole, and eventually replace the rear sole altogether when the sole is excessively worn. By periodically changing the position of the rear sole, more uniform wear and long life (both outsole and midsole) can be achieved. Additional longevity in wear may also be achieved by interchanging removable rear soles as between the right and left shoes, which typically exhibit opposite wear patterns.

In addition, some users will prefer to change the rear soles not because of adverse wear patterns, but because of a desire for different performance characteristics or playing surfaces. For example, it is contemplated that a person using this invention in a shoe marketed as a "cross-trainer" may desire one type of rear sole for one sport, such as basketball, and another type of rear sole for another, such as running. A basketball player might require a harder and firmer rear sole for stability where quick, lateral movement is essential, whereas a runner or jogger might tend to favor increased shock absorption features achievable from a softer, more cushioned heel. Similarly, a jogger planning a run outside on rough asphalt or cement might prefer a more resilient rear sole than the type that would be suitable to run on an already resilient indoor wooden track. Rear sole performance may also depend on the weight of the user or the amount or type of cushioning desired.

The present invention includes a shoe or shoe kit which includes or can accept a plurality of rear soles **150** having different characteristics and/or surface configurations, thereby providing a cross trainer shoe. As explained in more detail below, the shoe can also be designed to accept and use different flexible members in the rear sole area, to achieve optimal flex and cushioning, through the combination of a flexible member and rear sole selected to provide the most desirable flex, cushion, wear, support, and traction for a given application. In a preferred embodiment, both the rear sole and the flexible member are replaceable and a given rear sole can be locked in a plurality of separate positions relative to the recess in which it is held.

Since rear sole **150** shown in FIGS. 1 and 2 is selectively positionable relative to rear sole support **140** in a single plane about an axis perpendicular to the major longitudinal axis of the shoe, it may be moved to a plurality of positions with a means provided to allow the user to secure the rear sole at each desired position. After a period of use, outsole **154** will exhibit a wear pattern at the point in which the heel first contacts the ground, when the user is running, for example. Excessive wear normally occurs at this point, and at midsole **158** generally above this point, degrading the performance of the rear sole. When the user determines that the wear in this area is significant, the user can rotate the rear sole so that the worn portion will no longer be in the location of the user's first heel strike. For the shoe shown in FIGS. 1 and 2, rotation is accomplished by detaching the rear sole and reattaching at the desired location. For the embodiment in FIG. 3 discussed below, the rear sole may be rotated without separating it from the rear sole support. The number of positions into which rear sole of FIGS. 1 and 2 can be rotated is limited by the number of knobs/openings, but is unlimited for the rear sole shown in FIG. 3. The use of other mechanical locking systems to allow selective movement

and locking of the rear sole is contemplated within the spirit of the invention.

Rotating the rear sole about an axis normal to the shoe's major axis to a position, for example, 180 degrees beyond its starting point, will locate the worn portion of the rear sole at or near the instep portion of the shoe. The instep portion is an area of less importance for tractioning, stability, cushioning and shock absorbing purposes. As long as the worn portion of the rear sole is rotated beyond the area of the initial heel strike, prolonged use of the rear sole is possible. The user can continue periodically to rotate the rear sole so that an unworn portion of the rear sole is located in the area of the first heel strike.

The shape of rear sole can be circular, polygonal, elliptical, "sand-dollar," elongated "sand-dollar," or otherwise. The shape of recess **146** is formed to be compatible with the shape of the rear sole. In all embodiments, the invention includes mechanical means for selectively locking the rear sole relative to the rear sole support and upper of the shoe. Preferably, the rear sole is shaped so that at least the rear edge of the outsole has a substantially identical profile at several, or preferably each rotated position. To allow for a plurality of rotatable positions, the shape of the outsole preferably should be symmetrical about its central axis. As shown in FIG. **1**, the rear sole has four beveled portions which are symmetrically positioned about its central axis. The user in this embodiment can rotate the rear sole 120° and place an unworn beveled portion at the rear heel region of the shoe, where wear is often maximum. Alternatively, the rear sole could have two beveled portions, 180° apart (in an oval embodiment this would have to be the case), in which event only one rotation per shoe, plus an exchange between right and left rear soles, would be possible, before replacement of rear soles would be necessary.

While the above discussion is directed towards a rear sole that rotates or separates in its entirety, it is specifically contemplated that the same benefits of this invention can be achieved if only a portion of the rear sole is rotatable or removable. For example, a portion of the rear sole, e.g., the center area, may remain stationary while the periphery of the ground-engaging surface or outsole rotates and/or is detachable. As another example, the rear sole may not be removable but only rotatably positionable.

In a preferred embodiment of the invention, the shoe of the present invention includes a flexible region **200** that is positioned above the rear sole and has a central portion that in its normal unflexed state is spaced upwardly from the portion of the shoe (rear sole support, or rear sole) immediately below it. The flexible region **200** is designed to provide a preselected degree of flex, cushioning, and spring, to thereby reduce or eliminate heel-center midsole compression found in conventional materials. Flexible region **200** is made of stiff, but flexible, material. Examples of materials that may be used in the manufacture of flexible member **200** include the following: graphite; fiberglass; graphite (carbon) fibers set in a resin (i.e. acrylic resin) binder, fiberglass fibers set in a resin (i.e. acrylic resin) binder, a combination of graphite (carbon) fibers and fiberglass fibers set in a resin (i.e. acrylic resin) binder, nylon, glass-filled nylon, epoxy, polypropylene, polyethylene, acrylonitrile butadiene styrene (ABS); other types of injection-molded thermoplastic engineering resins, spring steel; and stainless spring steel. The flexible region **200** can be incorporated into other elements of the shoe or can be a separate flexible member or plate.

As shown in FIG. **2**, flexible member **200** can be in the form of a plate supported at its peripheral region by an upward facing top surface of rear sole support **140**. In this embodiment, the member, or plate **200** is positioned between the rear sole **150** and the heel portion of upper **120**. A ledge **148** may be formed in rear sole support **140** to support and laterally stabilize flexible member **200**.

The flexible member may also be permanently attached to the top or bottom of the rear sole support or detachably secured to the shoe upper and removable through a pocket formed in the material (not shown) typically located on the bottom surface of the upper, or it can be exposed and removed after removing the sock liner or after lifting the rear portion of the sock liner. Alternatively, it may be totally exposed as in the case of flexible member **200** shown in FIG. **18**, wherein the U-shaped cushioning member may have direct contact with the user's heel without an intervening sock liner in the heel portion of the shoe. The removability of the flexible member allows the use of several different types of flexible members of varying stiffness or composition and, therefore, can be adapted according to the weight of the runner, the ability of the runner, the type of exercise involved, or the amount of cushioning and/or spring desired in the heel of the shoe.

Rear sole **150** may have a concave top surface **167**, as shown in FIG. **2**. Therefore, when the rear sole is attached to the rear sole support, the top surface of the rear sole does not come into contact with the flexible member when the flexible member deflects within its designed range of flex. As a result, the middle of the flexible member can flex under the weight of the user without being impeded by rear sole **150**. Flexible member **200** thus acts like a trampoline to provide extra spring in the user's gait in addition to minimizing, or preventing, midsole compression in the central portion of the rear sole.

A second preferred embodiment is shown in FIG. **3**. In this embodiment, a rear sole **250** is identical to rear sole **150** shown in FIG. **2** except that it has a groove **254** below upper midsole portion **252**, instead of knobs **165**. A rear sole support **240** includes a downwardly extending wall **244** that has a serrated bottom edge **246** and a threaded inner surface **248**. Rear sole support **240** also includes an upper rim **249**.

The embodiment of FIG. **3** also indicates a threaded ring **400**. Ring **400** includes a threaded outer rim **410** that mates with threaded inner surface **248** of rear sole support **240**. The ring also includes an outwardly and inwardly extending flange **412** that presses against serrated bottom edge **246** when the ring is screwed into the rear sole support. The bottom surface of flange **412** includes anchors **414**, and may also be serrated to further grip the rear sole to prevent rotation. The ring also has two ends **416** and **418**, and end **416** may have a male member and end **418** may be shaped to receive the male member to lock the two ends together. Ring **400** may be made of hard plastic or other substantially rigid materials that provide a secure engagement with rear sole support **240** and a firm foundation for supporting flexible member **200**.

Rear sole **250** is attached to rear sole support **240** by unlocking the ends of ring **400** and positioning ring **400** around upper midsole portion **252** of the rear sole such that flange **412** engages groove **254**. Ring **400** is then firmly locked onto the rear sole by mating end **416** with end **418**. Flexible member **200** is inserted into the rear sole support so that it presses against upper rim **249**. Ring **400**, with rear sole **250** attached, is then screwed into the rear sole support by engaging threaded surface **410** of the ring with threaded surface **248** of wall **244**. The ring is then screwed into the rear sole support until serrated edge **246** of wall **244** engages

flange 412 of ring 400. Serrated edge 246 serves to prevent rotation of the ring during use and the top edge of ring 400 firmly supports flexible member 200.

The rear sole support sidewalls need not be continuous around the entire recess. Such sidewalls may be substantially eliminated on the lateral and medial sides of the rear sole support, or even at the rear and/or front of the rear sole support, exposing ring 400 when installed, even allowing it to protrude through the sidewalls where the openings are created This has no effect whatsoever on the thread alignment on the inside surface of the remaining sidewalls. The advantage of doing this is that a ring with a slightly larger diameter than otherwise possible and, hence, a flexible member with a slightly larger diameter than otherwise possible may be employed.

In the embodiment shown in FIG. 3, a variety of different flexible members 200 having different flex and cushioning characteristics can be selectively incorporated into the shoe. Flexible member 200, once incorporated into the shoe, is securely held in place with rear sole support 240. Preferably, the rear sole support contacts flexible member 200 only along its outer periphery, and rear sole support 240 includes an opening above the flexible member, thereby permitting the plate to protrude upwardly toward the user's heel. Moreover, because the top surface of rear sole 250 is preferably concave in shape, the central portion of the rear sole does not contact the central portion of the flexible member in its unflexed, normal position. As a result, the flexible member can also flex downward. The degree of flexing of the member can be controlled both by the selection of the material and shape of the member, as well as the relative dimensions and shape of rear sole support 240 and rear sole 250. While flexible member 200 and the corresponding recess in rear sole support 240 are circular in FIG. 3, other shapes can be utilized. Rear sole support 240 could be designed to include a recess above upper rim 249 to accept the flexible member and a mechanical means, such as a circular locking ring, similar to ring 400, to support and lock the flexible member in place. In such an embodiment, the user could change the flexible member from the inside of the shoe. Similarly, the flexible member 200 could be fixedly secured to, or incorporated as an integral part, of either the rear sole support or the rear sole. Similar configurations of an integral flexible region are within the spirit of the invention.

The embodiment of FIG. 3 and other embodiments of the invention preferably provide a shoe that includes a flexible region or member which has its own preselected spring and cushioning characteristic and which is preferably removable and replaceable, a rear sole with its own pre-selected cushioning properties (both outsole and midsole) and which is preferably removable, replaceable, and capable of being locked in place at a plurality of preselected positions; a plurality of beveled portions on the outer surface of the rear sole which are preferably symmetrically located about its axis; and an interrelationship of the flexible member, rear sole support, and rear sole which permit the flexible member to freely flex to at least a predetermined degree. The flexible region and its characteristics, the rear sole and its characteristics, and the rear sole's relative location to the flexible region can be selectively altered, to provide in combination an optimal shoe for a given application. Also, because of the rear sole rotation and replacement permitted by the invention, typically heavy outsole material may be made thinner than on conventional athletic shoes, thus reducing the weight of the shoe. The invention also permits the weight of the shoe to be further reduced because the central portion of the midsole of the rear sole can be eliminated, since the flexible region of the shoe provides weight bearing and cushioning at this area

Other rear sole support/rear sole combinations for securing the rear sole to the shoe and for supporting the flexible member at or below the heel region of the upper are contemplated and fall within the spirit of this invention, as described and claimed. By means of example only, some such additional configurations are disclosed in commonly-owned U.S. patent application Ser. No. 08/291,945, which is incorporated herein by reference.

The flexible region of the present invention is not limited to a circular shape and can be adapted to conform to the shape of the rear sole. The flexible region also need not be used only in conjunction with a detachable rear sole, but can be used with permanently attached rear soles as well.

FIGS. 4–17 show various alternative embodiments of the flexible member. In each of these embodiments, the flexible member may be curved or convex in shape, or have an inwardly curved or concave bottom surface, such that the interior portion of the flexible member is elevated relative to its periphery when the flexible member is positioned in the shoe in its normal position. Each of the following flexible member embodiments may be used in conjunction with the rear sole support/rear sole combinations disclosed in FIGS. 1–3 and more generally disclosed in this disclosure in its entirety. In addition the following disclosed embodiments of flexible members can be integrally incorporated into a portion of the shoe. In either event, the resultant shoe has a flexible region which provides a preselected flex and spring.

As shown in FIG. 4, flexible member 500 has a concave under surface 502 (when viewed from its bottom) and an opposing convex upper surface, and is circular in shape. As a result, the interior portion of the flexible member 500 is elevated relative to its peripheral portion and is positioned below the rear sole of the user when supported in the shoe.

Flexible members 510 and 520 shown in FIGS. 1 and 6, respectively, are similar in structure to flexible member 500 except that flexible member 510 has a bottom surface 514 and a moon-shaped notch 512 and flexible member 520 has a bottom surface 524 and two opposing moon-shaped notches 522. Notch 512 of flexible member 510 is preferably aligned with the back of the rear sole. One of notches 522 of flexible member 520 may be aligned with the back of the rear sole, or alternatively such notches may be aligned with the lateral and medial sides of the shoe. Flexible member 530 as shown in FIG. 7 is identical in structure to flexible member 520 shown in FIG. 6 except that it is not convex in shape, but rather curved in only one direction. The flexible member 530 alignment options are the same as those of flexible member 520.

As shown in FIG. 8, flexible member 540 includes a plurality of spokes 542 each joined at one end to a hub 544 and joined at an opposite end to rim 546. The size, shape, and number of spokes is variable depending on the desired flexibility. As shown in FIG. 8, each of spokes 542 has a triangular cross-section, although the cross-section may also be square, rectangular, or any other geometrical shape. When positioned in the shoe, hub 544 is elevated relative to rim 546 such that hub 544 is closer to the heel region of the upper.

The flexible members shown in FIGS. 9–12 are variations of flexible member 540 shown in FIG. 8. Flexible member 550 shown in FIG. 9 is identical in structure to flexible member 540, but includes webbing 552 covering the top

surface of flexible member **550** and joining each of spokes **562** to reinforce flexible member **550**. Webbing **552** may be injection molded with the rest of flexible member. Flexible member **560** shown in FIG. **10** is similar in structure to flexible member **540** shown in FIG. **8**; however, spokes **562** decrease in thickness between hub **564** and the central portion of each of the spokes **562** and then increase in thickness from the central portion toward rim **566**.

Flexible member **570**, shown in FIG. **11**, also includes a plurality of spokes **572** joined at opposite ends to hub **574** and rim **576**. In this embodiment, the thickness of the spokes decreases in a direction from hub **574** toward rim **576**. In addition, webbing **578** may be placed over the top surface of flexible member **570** similar to that disclosed in FIG. **9**.

FIG. **12** illustrates a housing **580** for supporting the flexible member, in this example, flexible member **560**. Housing **580** has an L-shaped cross-section to support the bottom and side surfaces of rim **566**. Housing **580** may be inserted into the shoe heel with flexible member **560** or may be permanently affixed to the rear sole support. In either case, housing **580** acts as a reinforcement for limiting or eliminating lateral movement of flexible member **560** during use. This may have the effect of making the center of the flexible member more springy. It may also allow the member to be made of thinner and/or lighter weight material.

FIGS. **13** and **14** show further variations of flexible plate **500** shown in FIG. **4**. While flexible plate **500** has a generally uniform thickness at any given radius, flexible plate **585** shown in FIG. **13** decreases in thickness from the center of the member toward its periphery. Flexible member **590** shown in FIG. **14**, on the other hand, is thicker near the center and at the periphery, but thinner therebetween.

FIGS. **15–17A** disclose flexible members composed of carbon ribbons set in a resin binder. Alternatively, they may be fiberglass ribbons or a combination of carbon and fiberglass ribbons. Ribbons made of other types of fiber may also be used. Flexible member **600** includes radially or diametrically projecting ribbons **602**, either emanating from the center of flexible member toward its periphery or, preferably, passing through the center from a point on the periphery to a diametrically opposite point on the periphery. These ribbons **602** are fixed in position by a resin binder **604** known in the art. Flexible member **610** shown in FIG. **16** also includes carbon ribbons **602** set in a resin binder **604**, but further includes a rim **606** comprised of ribbon preset in the resin binder and defining the periphery of flexible member **610**. Flexible member **620** shown in FIG. **17** is identical to flexible member **610** shown in FIG. **16** except that it further includes a circular ribbon **608** disposed in resin binder **604** and circumscribing the center of flexible member **620**. The flexible member shown in FIG. **17A** is identical to the flexible member **610** shown in FIG. **17** except that it has fewer spokes and further includes a plurality of circular ribbons **608** spaced radially from the center of the member and disposed in the resin binder **604**. Flexible members **600**, **610**, and **620** may be convex in shape so that the center of the flexible member is raised relative to its outer perimeter, when placed in the shoe. They may also have a U-shaped cushioning member placed on or secured to their top surface like that shown in FIG. **18**.

Since it is contemplated that the flexible member will be composed of graphite or other stiff, but flexible, material, it is preferable to cushion the impact of the user's heel against the flexible member during use. As shown in FIG. **18**, a substantially U-shaped cushioning member **650** is disposed on the top surface of flexible member **500** to cushion the heel

upon impact. The U-shaped cushioning member is shaped to generally conform to the shape of the user's heel. Thus, the open end of the U-shape is oriented toward the front of the shoe. Cushioning member **650** may be composed of polyurethane or EVA or may be an air-filled or gel-filled member. Cushioning member **650** can be affixed to flexible member **500** by gluing, or may be made integral with flexible member **500** in an injection molding process. If injection molded, cushioning member **650** would be made of the same material as flexible member **500**. To decrease the stiffness of cushioning member **650** in this instance, small holes (not shown) may be drilled in cushioning member **650** to weaken it and thereby allow it to depress more readily upon impact and more uniformly with flexible member **500**.

The cushioning member **650** described above can be incorporated into a shoe having any of the various flexible regions disclosed in this application and drawings, as well as other shoes falling within the scope of the claims.

If cushioning member **650** is used, the shoe sock liner, which generally provides cushioning, may be thinner in the heel area or may terminate at the forward edge of cushioning member **650**. If cushioning member **650** is not used, the sock liner may extend to the rear of the shoe and may be shaped to conform to the user's heel on its top surface and the flexible member on its bottom surface. Its bottom surface may also compensate for gaps formed by the flexible member. For example, the sock liner may have a concave bottom surface in the heel area to correspond to those flexible members having convex upper surfaces.

In each of the above described embodiments, the flexible member is illustrated as a separate component of the shoe which can be removed from the shoe and replaced by a similar or different flexible member, as desired. In each of the embodiments the central portion of the flexible member is raised relative to its outer perimeter so that when placed in the shoe, the interior portion in its normal state does not touch the rear sole support and/or rear sole. As a result, the interior of the flexible member will flex in response to the user's stride without first, if ever, contacting the rear sole support and/or rear sole. Such flexible member, therefore, can be used with rear soles that have a flat upper surface, as well as those that have a concave upper surface. The relative shape and positioning of the flexible member and the adjacent rear sole support or rear sole can be designed to provide the optimum flex, stiffness, and spring characteristics. However, each of the above-described flexible members may be made integral with the rear sole support, which not only decreases the number of loose parts and increases the efficiency of the manufacturing process, but also further limits the lateral displacement of the periphery of the flexible member upon deflection, potentially creating more spring in the center and/or permitting the use of thinner and/or lighter weight material.

As shown in FIG. **19**, rear sole support **340** is identical in structure to rear sole support **140** shown in FIG. **2** except that rear sole support **340** has a flexible region **700** that serves the same purpose and function as any of the above-described flexible members. In fact, any of the above-described flexible members may be used as flexible region **700** so long as they can be made integral with rear sole support **340**. In this example, flexible region **700** is convex in shape and thus similar to flexible member **500** shown in FIG. **4**. Cushioning member **650** or a modified sock liner as described above may also be used.

The flexible region may be incorporated into other rear sole support embodiments as well. As an alternative to using

arch extension **180**, rear sole support **440** shown in FIGS. **20–22** includes a thickened tongue **447** that extends toward the ball of the foot. Thickened tongue **447** provides additional gluing surface for attaching the rear sole support to forward sole **160** and additional stiffness to the heel portion of the shoe and the arch area, thus mining the chances of separation of the forward sole from the rear sole support, and at the same time minimizing the tendency of the shoe to curl at the juncture of the hard rear sole support with the soft forward sole. Similar to rear sole support **240**, rear sole support **440** includes a heel counter **442** and a side wall **444**. Rear sole support **440** also includes a rim **448** and anchors **452** to receive and retain a rear sole with a mating groove, such as rear sole **250**. Forward sole **260** is longer in this embodiment to extend back to the edge where it would abut the rear sole. Flexible region **710** is identical to flexible region **700** in FIG. **19**.

In another embodiment, rear sole support **460**, as shown in FIGS. **23** and **24**, includes a tongue **462** that is tinner and slightly smaller than tongue **447** shown in FIGS. **20–22**. However, rear sole support **460** includes a curved wall **464** that has a pocket formed on its forward side for receiving a rating rear edge of forward sole **360** adjacent the rear sole support. Curved wall **464** provides a firm, smoothly contoured transition from hard-to-align resilient materials of the forward and rear soles and thereby minimizes gapping. It also provides a desirable brace or bumper for the lower portion of the rear sole when the user is running. Flexible region **720** is identical to flexible regions **700** and **710**.

As shown in FIGS. **25** and **26**, the flexible member may also be integrated with the securing member. Securing member **750** is similar in structure and function as securing member **400** in that it includes a wall **752** with a threaded outer surface, an inwardly and outwardly extending rim **754**, and anchors **756**. Securing member **750** also includes a convex flexible region **760** integral with wall **752**. Flexible region **760**, like flexible regions **700** and **710**, may incorporate any of the configurations shown in FIGS. **4–18**.

Securing member **750** is simply substituted for securing member **400** and flexible member **200** shown in FIG. **3** to attach rear sole **250** to rear sole support **240**. However, since sec g member **750** does not include mating ends **416**, **418**, rear sole **250** is press-fitted into securing member **70** until rear sole groove **2154** mates with securing member rim **754**. This may have the effect of making the center of the flexible member more springy. It may also allow the flexible member to be made of thinner and/or lighter weight material.

It will be apparent to those skilled in the art that various modifications and variations can be made in the system of the present invention without departing from the scope or spirit of the invention. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the claims and their equivalents.

What is claimed is:

1. A shoe comprising:

an upper having a heel region;

a rear sole having a rearward portion and an opposite forward portion connected below the heel region, the rear sole having a bottom surface at least a portion of which is ground engaging, the bottom surface including at least one substantially planar portion and at least three portions non-planar with the at least one substantially planar portion, the non-planar portions being positioned proximate the perimeter of the rear sole and separated from each other by other portions of the bottom surface, each of the non-planar portions being inclined upwardly from another portion of the bottom surface in a direction toward the perimeter of the rear sole, one of the at least three non-planar portions being proximate the rearward portion of the rear sole, and at least two of the at least three non-planar portions being proximate the forward portion of the rear sole and being oriented so that at least one edge of one of the at least two non-planar portions proximate the forward portion of the rear sole is proximate a medial side of the rear sole and at least one edge of the other of the at least two non-planar portions proximate the forward portion of the rear sole is proximate a lateral side of the rear sole;

a flexible plate having upper and lower surfaces and supported between at least a portion of the rear sole and at least a portion of the heel region of the upper, peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a direction substantially perpendicular to a major axis of the shoe so that the interior portion of the plate is capable of being deflected relative to the peripheral portions in a direction substantially perpendicular to the major axis of the shoe, at least a portion of the upper surface of the plate being convex, at least a portion of the lower surface of the plate being concave, the interior portion of the plate being positioned over a void; and

an opening in the bottom surface of the rear sole located beneath the interior portion of the plate, the opening being in communication with the void to expose the interior portion of the plate from outside of the shoe.

2. The shoe of claim **1**, wherein each of the non-planar portions has a maximum linear dimension less than the greatest width of the bottom surface along a line perpendicular to a major axis of the shoe.

3. The shoe of claim **1**, wherein the bottom surface includes an outsole material that is ground engaging, the rear sole including midsole material above the outsole material, at least a portion of the midsole material above the non-planar portions being thinner than the midsole material above the at least one substantially planar portion of the bottom surface of the rear sole.

4. The shoe of claim **1**, further comprising at least one wall proximate at least a portion of the peripheral portions of the plate and extending in at least one of an upwardly direction and a downwardly direction from the plate, the at least one wall being integral with the plate.

5. The shoe of claim **1**, wherein the upper has an arch region, and further comprising an arch bridge integral with the plate, the arch bridge extending from a position proximate a forward portion of the plate, forward beneath at least a portion of the arch region of the upper.

6. The shoe of claim **5**, wherein the arch bridge has a bottom surface that is at least in part visible from outside of the shoe.

7. The shoe of claim **1**, wherein the upper surface has at least two convex portions, at least a portion of the upper surface being concave, the concave portion of the upper surface being located between the two convex portions of the upper surface.

8. The shoe of claim **1**, further comprising at least one sidewall above at least a portion of the bottom surface of the rear sole, the at least one sidewall having at least one hole therethrough located on at least one of a lateral side, a medial side, and a rear of the shoe.

9. The shoe of claim **1**, wherein at least a substantial portion of the peripheral portions of the flexible plate is

restrained from movement relative to the interior portion of the flexible plate.

10. The shoe of claim **1**, wherein the peripheral portions of the flexible plate being restrained from movement relative to the interior portion are at a point along a medial side and at a point along a lateral side of the shoe.

11. The shoe of claim **1**, wherein a forward facing portion and a rearward facing portion of the peripheral portions of the flexible plate are restrained from movement relative to the interior portion.

12. The shoe of claim **1**, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion at at least two spaced apart points along a medial side of the shoe and at at least two spaced apart points along a lateral side of the shoe, the interior portion of the plate being located above a point between the at least two points along the medial side of the shoe and the at least two points along the lateral side of the shoe and beneath the approximate center of the user's heel.

13. The shoe of claim **12**, wherein upon the deflection of the interior portion of the plate, the at least two points along the medial side of the shoe and the at least two points along the lateral side of the shoe are displaceable in a direction substantially parallel to the ground.

14. The shoe of claim **1**, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion both along at least a portion of a medial side and at least a portion of a lateral side of the shoe and on at least a portion of a forward facing portion and at least a portion of a rearward facing portion of the peripheral portions of the flexible plate.

15. The shoe of claim **1**, wherein at least one of the peripheral portions of the plate being restrained from movement is along the upper surface of the plate and at least one of the peripheral portions of the plate being restrained from movement is along the lower surface of the plate.

16. The shoe of claim **15**, wherein the peripheral portions are both toward the front of the shoe.

17. The shoe of claim **15**, wherein the peripheral portions are both toward the back of the shoe.

18. The shoe of claim **15**, wherein the peripheral portions are both on the lateral side of the shoe.

19. The shoe of claim **15**, wherein the peripheral portions are both on the medial side of the shoe.

20. The shoe of claim **15**, wherein the peripheral portions of the upper and lower surfaces are proximate one another.

21. The shoe of claim **20**, where the capable of being deflected interior portion is located between the portions of the upper and lower surfaces and a point beneath a central portion of the heel region of the upper.

22. A shoe comprising:

an upper having a heel region and an arch region;

a rear sole having a bottom surface, the rear sole being secured below the heel region of the upper;

a flexible plate having upper and lower surfaces and supported between at least a portion of the rear sole and at least a portion of the heel region of the upper, peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a direction substantially perpendicular to a major axis of the shoe so that the interior portion of the plate is capable of being deflected relative to the peripheral portions in a direction substantially perpendicular to the major axis of the shoe, at least a portion of the upper surface of the plate being convex, at least a portion of the lower surface of the plate being concave, the interior portion of the plate being positioned over a void;

an opening in the bottom surface of the rear sole located beneath the interior portion of the plate, the opening being in communication with the void to expose the interior portion of the plate from outside of the shoe;

an arch bridge integral with the plate, the arch bridge extending from a position proximate a forward portion of the plate, forward beneath at least a portion of the arch region of the upper, and

at least one wall proximate at least a portion of the peripheral portions of the plate and extending in at least one of an upwardly direction and a downwardly direction from the plate, the at least one wall being integral with the plate.

23. The shoe of claim **22**, wherein the at least one wall extends in an upwardly direction.

24. The shoe of claim **23**, wherein the upwardly extending wall is connected to at least a portion of the heel region of the upper.

25. The shoe of claim **23**, wherein at least a portion of the upwardly extending wall is visible from outside of the shoe.

26. The shoe of claim **25**, wherein at least a portion of the upwardly extending wall is visible from a medial side of the shoe, from a lateral side of the shoe, and from a rear of the shoe.

27. The shoe of claim **23**, wherein the at least one wall includes a wall extending in a downwardly direction.

28. The shoe of claim **27**, wherein the downwardly extending wall contacts at least a portion of the rear sole.

29. The shoe of claim **27**, wherein at least a portion of the downwardly extending wall is visible from outside of the shoe.

30. The shoe of claim **29**, wherein at least a portion of the downwardly extending wall is visible from a medial side of the shoe, from a lateral side of the shoe, and from a rear of the shoe.

31. The shoe of claim **22**, wherein the at least one wall extends in a downwardly direction.

32. The shoe of claim **31**, wherein the downwardly extending wall contacts at least a portion of the rear sole.

33. The shoe of claim **31**, wherein at least a portion of the downwardly extending wall is visible from outside of the shoe.

34. The shoe of claim **22**, wherein the arch bridge is integral with an upwardly extending wall on at least one of a lateral side and a medial side of the shoe.

35. The shoe of claim **34**, wherein the upwardly extending wall is at least in part visible from outside of the shoe.

36. The shoe of claim **22**, wherein the arch bridge has a bottom surface that is at least in substantial part visible from outside of the shoe.

37. The shoe of claim **36**, wherein the bottom surface of the arch bridge is visible on a line perpendicular to a major axis of the shoe across a width of the arch bridge.

38. The shoe of claim **22**, wherein the arch bridge is integral with a downwardly extending wall.

39. The shoe of claim **38**, wherein at least a portion of the downwardly extending wall is visible from outside of the shoe.

40. The shoe of claim **38**, wherein the downwardly extending wall contacts at least a portion of the rear sole.

41. The shoe of claim **38**, wherein the downwardly extending wall is integral with a rearward portion of the arch bridge.

42. The shoe of claim **38**, wherein the downwardly extending wall is arcuate.

43. The shoe of claim **38**, wherein the downwardly extending wall is at least in pad acurate

44. The shoe of claim 38, wherein the downwardly extending wall is curved.

45. The shoe of claim 38, wherein the downwardly extending wall is at least in part curved.

46. The shoe of claim 22, wherein the rear sole has a rearward portion and an opposite forward portion connected below the heel region, the rear sole having a bottom surface at least a portion of which is ground engaging, the bottom surface including at least one substantially planar portion and at least two portions non-planar with the at least one substantially planar portion, the non- planar portions being positioned proximate the perimeter of the rear sole and separated from each other by other portions of the bottom surface, each of the non-planar portions being inclined upwardly from another portion of the bottom surface in a direction toward the perimeter of the rear sole, one of the at least two non-planar portions being proximate the rearward portion of the rear sole, and the other of the at least two non-planar portions being proximate the forward portion of the rear sole.

47. The shoe of claim 22, wherein the upper surface has at least two convex portions, at least a portion of the upper surface being concave, the concave portion of the upper surface being located between the two convex portions of the upper surface.

48. The shoe of claim 22, further comprising at least one sidewall above at least a portion of the bottom surface of the rear sole, the at least one sidewall having at least one hole therethrough located on at least one of a lateral side, a medial side, and a rear of the shoe.

49. The shoe of claim 22, wherein at least a substantial portion of the peripheral portions of the flexible plate is restrained from movement relative to the interior portion of the flexible plate.

50. The shoe of claim 22, wherein the peripheral portions of the flexible plate being restrained from movement relative to the interior portion are at a point along a medial side and at a point along a lateral side of the shoe.

51. The shoe of claim 22, wherein a forward facing portion and a rearward facing portion of the peripheral portions of the flexible plate are restrained from movement relative to the interior portion.

52. The shoe of claim 22, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion at at least two spaced apart points along a medial side of the shoe and at at least two spaced apart points along a lateral side of the shoe, the interior portion of the plate being located above a point between the at least two points along the medial side of the shoe and the at least two points along the lateral side of the shoe and beneath the approximate center of the users heel.

53. The shoe of claim 52, wherein upon the deflection of the interior portion of the plate, the at least two points along the medial side of the shoe and the at least two points along the lateral side of the shoe are displaceable in a direction substantially parallel to the ground.

54. The shoe of claim 22, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion both along at least a portion of a medial side and at least a portion of a lateral side of the shoe and on at least a portion of a forward facing portion and at least a portion of a rearward facing portion of the peripheral portions of the flexible plate.

55. The shoe of claim 22, wherein at least one of the peripheral portions of the plate being restrained from movement is along the upper surface of the plate and at least one of the peripheral portions of the plate being restrained from movement is along the lower surface of the plate.

56. The shoe of claim 55, wherein the peripheral portions are both toward the front of the shoe.

57. The shoe of claim 55, wherein the peripheral portions are both toward the back of the shoe.

58. The shoe of claim 55, wherein the peripheral portions are both on the lateral side of the shoe.

59. The shoe of claim 55, wherein the peripheral portions are both on the medial side of the shoe.

60. The shoe of claim 55, wherein the peripheral portions of the upper and lower surfaces are proximate one another.

61. The shoe of claim 60, wherein the capable of being deflected interior portion is located between the peripheral portions of the upper and lower surfaces and a point beneath a central portion of the heel region of the upper.

62. A shoe comprising:

an upper having a heel region;

a rear sole having a bottom surface, the rear sole being secured below the heel region of the upper,

a flexible plate having upper and lower surfaces and supported between at least a portion of the rear sole and at least a portion of the heel region of the upper, peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a direction substantially perpendicular to a major axis of the shoe so that the interior portion of the plate is capable of being deflected relative to the peripheral portions in a direction substantially perpendicular to the major axis of the shoe, at least a portion of the upper surface of the plate being convex, at least a portion of the lower surface of the plate being concave, the interior portion of the plate being positioned over a void;

an opening in the bottom surface of the rear sole located beneath the interior portion of the plate, the opening being in communication with the void to expose the interior portion of the plate from outside of the shoe, and

at least one sidewall above at least a portion of the bottom surface of the rear sole, the at least one sidewall having at least one hole therethrough located on at least one of a lateral side, a medial side, and a rear of the shoe.

63. The shoe of claim 62, wherein the at least one hole includes at least two holes, at least one of the at least two holes being on the medial side of the shoe and at least one of the at least two holes being on the lateral side of the shoe.

64. The shoe of claim 63, wherein the plate is at least in pad visible through both of the at least two holes.

65. The shoe of claim 62, wherein the plate is at least in part visible through the at least one hole.

66. The shoe of claim 62, wherein the at least one sidewall has an interior surface, the void being defined at least in part by the interior surface of the at least one sidewall.

67. The shoe of claim 66, wherein the void is at least in part visible through the at least one hole.

68. The shoe of claim 67, wherein at least one hole includes at least two holes, at least one of the at least two holes being on the medial side of the shoe and at least one of the at least two holes being on the lateral side of the shoe, the void being at least in part visible through both of the at least two holes.

69. The shoe of claim 66, wherein the interior surface of the at least one sidewall is visible through the opening in the bottom surface of the rear sole.

70. The shoe of claim 66, wherein at least a portion of the interior surface of the at least one sidewall is visible through the at least one hole in the at least one sidewall.

71. The shoe of claim 66, wherein the at least one hole in the at least one sidewall is on the lateral side of the shoe, the interior surface of the at least one sidewall on the medial side of the shoe being visible through the at least one hole.

72. The shoe of claim 62, wherein the at least one sidewall includes midsole material.

73. The shoe of claim 62, wherein the at least one sidewall includes outsole material.

74. The shoe of claim 62, wherein the at least one sidewall includes both midsole material and outsole material.

75. The shoe of claim 62, further comprising at least one wall proximate at least a portion of the peripheral portions of the plate and extending in at least one of an upwardly direction and a downwardly direction from the plate, the at least one wall being integral with the plate.

76. The shoe of claim 62, wherein the upper has an arch region, and further comprising an arch bridge integral with the plate, the arch bridge extending from a position proximate a forward portion of the plate, forward beneath at least a portion of the arch region of the upper.

77. The shoe of claim 76, wherein the arch bridge has a bottom surface that is at least in part visible from outside of the shoe.

78. The shoe of claim 62, wherein the rear sole has a rearward portion and an opposite forward portion connected below the heel region, the rear sole having a bottom surface at least a portion of which is ground engaging, the bottom surface including at least one substantially planar portion and at least two portions non-planar with the at least one substantially planar portion, the non- planar portions being positioned proximate the perimeter of the rear sole and separated from each other by other portions of the bottom surface, each of the non-planar portions being inclined upwardly from another portion of the bottom surface on a direction toward the perimeter of the rear sole, one of the at least two non-planar portions being proximate the rearward portion of the rear sole, and the other of the at least two non-planar portions being proximate the forward portion of the rear sole.

79. The shoe of claim 62, wherein the upper surface has at least two convex portions, at least a portion of the upper surface being concave, the concave portion of the upper surface being located between the two convex portions of the upper surface.

80. The shoe of claim 62, wherein at least a substantial portion of the peripheral portions of the flexible plate is restrained from movement relative to the interior portion of the flexible plate.

81. The shoe of claim 62, wherein the peripheral portions of the flexible plate being restrained from movement relative to the interior portion are at a point along a medial side and at a point along a lateral side of the shoe.

82. The shoe of claim 62, wherein a forward facing portion and a rearward facing portion of the peripheral portions of the flexible plate are restrained from movement relative to the interior portion.

83. The shoe of claim 62, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion at at least two spaced apart points along a medial side of the shoe and at at least two spaced apart points along a lateral side of the shoe, the interior portion of the plate being located above a point between the at least two points along the medial side of the shoe and the at least two points along the lateral side of the shoe and beneath the approximate center of the user's heel.

84. The shoe of claim 83, wherein upon the deflection of the interior portion of the plate, the at least two points along the medial side of the shoe and the at least two points along the lateral side of the shoe are displaceable in a direction substantially parallel to the ground.

85. The shoe of claim 62, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion both along at least a portion of a medial side and at least a portion of a lateral side of the shoe and on at least a portion of a forward facing portion and at least a portion of a rearward facing portion of the peripheral portions of the flexible plate.

86. The shoe of claim 62, wherein at least one of the peripheral portions of the plate being restrained from movement is along the upper surface of the plate and at least one of the peripheral portions of the plate being restrained from movement is along the lower surface of the plate.

87. The shoe of claim 86, wherein the peripheral portions are both toward the front of the shoe.

88. The shoe of claim 86, wherein the peripheral portions are both toward the back of the shoe.

89. The shoe of claim 86, wherein the peripheral portions are both on the lateral side of the shoe.

90. The shoe of claim 86, wherein the peripheral portions are both on the medial side of the shoe.

91. The shoe of claim 86, wherein the peripheral portions of the upper and lower surfaces are proximate one another.

92. The shoe of claim 91, wherein the capable of being deflected interior portion is located between the peripheral portions of the upper and lower surfaces and a point beneath a central portion of the heel region of the upper.

93. A shoe comprising:

an upper having a heel region;

a rear sole secured below the heel region of the upper; and

a flexible plate having upper and lower surfaces and positioned between at least a portion of the rear sole and at least a portion of the heel region of the upper, peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a direction substantially perpendicular to a major axis of the shoe so that the interior portion of the plate is capable of being deflected relative to the peripheral portions in a direction substantially perpendicular to the major axis of the shoe, the upper surface having at least one concave portion, and the lower surface being at least in part visible from outside of the shoe.

94. The shoe of claim 93, wherein the lower surface is at least in part visible through an opening in the rear sole.

95. The shoe of claim 93, wherein the upper surface has at least one convex portion, the at least one convex portion being adjacent the at least one concave portion of the upper surface.

96. The shoe of claim 95, wherein the upper surface has at least two convex portions, the concave portion of the upper surface being located between the convex portions of the upper surface.

97. The shoe of claim 96, further comprising at least one wall proximate at least a portion of the peripheral portions of the plate and extending in at least one of an upwardly direction and a downwardly direction from the plate, the at least one wall being integral with the plate.

98. The shoe of claim 96, wherein the upper has an arch region, and further comprising an arch bridge integral with the plate, the arch bridge extending from a position proximate a forward portion of the plate, forward beneath at least a portion of the arch region of the upper, the arch bridge having a bottom surface that is at least in part visible from outside of the shoe.

99. The shoe of claim 96, wherein the rear sole has a rearward portion and an opposite forward portion connected

below the heel region, the rear sole having a bottom surface at least a portion of which is ground engaging, the bottom surface including at least one substantially planar portion and at least two portions non-planar with the at least one substantially planar portion, the non- planar portions being positioned proximate the perimeter of the rear sole and separated from each other by other portions of the bottom surface, each of the non-planar portions being inclined upwardly from another portion of the bottom surface in a direction toward the perimeter of the rear sole, one of the at least two non-planar portions being proximate the rearward portion of the rear sole, and the other of the at least two non-planar portions being proximate the forward portion of the rear sole.

100. The shoe of claim **93**, further comprising at least one wall extending in at least one of an upwardly direction and a downwardly direction, the at least one wall being integral with at least a portion of the peripheral portions of the plate.

101. The shoe of claim **93**, wherein the upper has an arch region, and further comprising an arch bridge integral with the plate, the arch bridge extending from a position proximate a forward portion of the plate, forward beneath at least a portion of the arch region of the upper, the arch bridge further having a bottom surface that is at least in part visible from outside of the shoe.

102. The shoe of claim **93**, wherein the rear sole has a rearward portion and an opposite forward portion connected below the heel region, the rear sole having a bottom surface at least a portion of which is ground engaging, the bottom surface including at least one substantially planar portion and at least two portions non-planar with the at least one substantially planar portion, the non- planar portions being positioned proximate the perimeter of the rear sole and separated from each other by other portions of the bottom surface, each of the non-planar portions being inclined upwardly from another portion of the bottom surface in a direction toward the perimeter of the rear sole, one of the at least two non-planar portions being proximate the rearward portion of the rear sole, and the other of the at least two non-planar portions being proximate the forward portion of the rear sole.

103. The shoe of claim **93**, further comprising at least one sidewall above at least a portion of the bottom surface of the rear sole, the at least one sidewall having at least one hole therethrough located on at least one of a lateral side, a medial side, and a rear of the shoe.

104. The shoe of claim **93**, wherein at least a substantial portion of the peripheral portions of the flexible plate is restrained from movement relative to the interior portion of the flexible plate.

105. The shoe of claim **93**, wherein the peripheral portions of the flexible plate being restrained from movement relative to the interior portion are at a point along a medial side and at a point along a lateral side of the shoe.

106. The shoe of claim **93**, wherein a forward facing portion and a rearward facing portion of the peripheral portions of the flexible plate are restrained from movement relative to the interior portion.

107. The shoe of claim **93**, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion at at least two spaced apart points along a medial side of the shoe and at at least two spaced apart points along a lateral side of the shoe, the interior portion of the plate being located above a point between the at least two points along the medial side of the shoe and the at least two points along the lateral side of the shoe and beneath the approximate center of the user's heel.

108. The shoe of claim **107**, wherein upon the deflection of the interior portion of the plate, the at least two points along the medial side of the shoe and the at least two points along the lateral side of the shoe are displaceable in a direction substantially parallel to the ground.

109. The shoe of claim **93**, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion both along at least a portion of a medial side and at least a portion of a lateral side of the shoe and on at least a portion of a forward facing portion and a rearward facing portion of the peripheral portions of the flexible plate.

110. The shoe of claim **93**, wherein at least one of the peripheral portions of the plate being restrained from movement is along the upper surface of the plate and at least one of the peripheral portions of the plate being restrained from movement is along the lower surface of the plate.

111. The shoe of claim **110**, wherein the peripheral portions are both toward the front of the shoe.

112. The shoe of claim **110**, wherein the peripheral portions are both toward the back of the shoe.

113. The shoe of claim **110**, wherein the peripheral portions are both on the lateral side of the shoe.

114. The shoe of claim **110**, wherein the peripheral portions are both on the medial side of the shoe.

115. The shoe of claim **110**, wherein the peripheral portions of the upper and lower surfaces are proximate one another.

116. The shoe of claim **115**, wherein the capable of being deflected interior portion is located between the peripheral portions of the upper and lower surfaces and a point beneath a central portion of the heel region of the upper.

117. A shoe comprising:

an upper having a heel region;

a rear sole secured below the heel region of the upper;

a flexible plate having upper and lower surfaces and supported between at least a portion of the rear sole and at least a portion of the heel region of the upper, peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a direction substantially perpendicular to a major axis of the shoe so that the interior portion of the plate is capable of being deflected relative to the peripheral portions in a direction substantially perpendicular to the major axis of the shoe, at least one portion of a cross section of the plate perpendicular to a major axis of the shoe defining a curve in a direction generally from a medial side of the shoe to a lateral side of the shoe; and

an opening in the bottom surface of the rear sole located beneath the interior portion of the plate that exposes the interior portion of the plate.

118. A shoe comprising:

an upper having a heel region;

a rear sole secured below the heel region of the upper;

a flexible plate having upper and lower surfaces and supported between at least a portion of the rear sole and at least a portion of the heel region of the upper, peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a direction substantially perpendicular to a major axis of the shoe so that the interior portion of the plate is capable of being deflected relative to the peripheral portions in a direction substantially perpendicular to the major axis of the shoe, at least one portion of a cross section of the plate parallel to the major axis of the shoe defining a curve in a direction generally from a front of the shoe to a back of the shoe; and

an opening in the bottom surface of the rear sole located beneath the interior portion of the plate that exposes the interior portion of the plate.

119. The shoe of claim **118**, wherein the upper surface has at least two convex portions, at least a portion of the upper surface being concave, the concave portion of the upper surface being located between the two convex portions of the upper surface.

120. The shoe of claim **118**, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion at at least two spaced apart points along a medial side of the shoe and at at least two spaced apart points along a lateral side of the shoe, the interior portion of the plate being located above a point between the at least two points along the medial side of the shoe and the at least two points along the lateral side of the shoe and beneath the approximate center of the user's heel, the at least two points along the medial side of the shoe and the at least two points along the lateral side of the shoe being displaceable in a direction substantially parallel to the ground upon the deflection of the interior portion of the plate.

121. A shoe comprising:

an upper having a heel region;

a rear sole secured below the heel region of the upper;

a flexible plate having upper and lower surfaces and supported between at least a portion of the rear sole and at least a portion of the heel region of the upper, peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a direction substantially perpendicular to a major axis of the shoe so that the interior portion of the plate is capable of being deflected relative to the peripheral portions in a direction substantially perpendicular to the major axis of the shoe, at least one portion of a cross section of the plate perpendicular to a major axis of the shoe defining a curve in a direction generally from a medial side of the shoe to a lateral side of the shoe, at least one portion of a cross section of the plate parallel to the major axis of the shoe defining a curve in a direction generally from a front of the shoe to a back of the shoe, and

an opening in the bottom surface of the rear sole located beneath the interior portion of the plate that exposes the interior portion of the plate.

122. A shoe comprising:

an upper having a heel region;

a rear sole secured below the heel region and having a rearward portion, the rear sole further having a bottom surface at least a portion of which is ground engaging, the ground-engaging portion of the bottom surface including at least one substantially planar portion and at least one portion non-planar with the at least one substantially planar portion, the at least one non-planar portion being positioned proximate a perimeter of the bottom surface and inclined upwardly in a direction toward the perimeter of the bottom surface from another portion of the bottom surface, the at least one non-planar portion having an outer edge coincident with the perimeter of the bottom surface and being located proximate the rearward portion of the rear sole;

a flexible plate having upper and lower surfaces and positioned between at least a portion of the rear sole and at least a portion of the heel region of the upper, peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a direction substantially perpendicular to a major axis of the shoe so that the interior portion of the plate is capable of being deflected relative to the peripheral portions in a direction substantially perpendicular to the major axis of the shoe, the upper surface of the plate being in at least substantial pad concave in shape, the interior portion of the plate being positioned over a void, and the lower surface of the plate being at least in part visible from outside of the shoe; and

a sidewall that includes midsole material located beneath the plate, the sidewall having an exterior surface that is at least in part visible from outside the shoe and an interior surface that at least partially defines the void, the sidewall further having at least one opening therethrough on at least one of a lateral side of the shoe, a medial side of the shoe, and a rear of the shoe.

123. The shoe of claim **122**, wherein the at least one opening is on both a medial side of the shoe and a lateral side of the shoe.

124. The shoe of claim **122**, wherein at least one opening is on both a medial side of the shoe and a lateral side of the shoe, and on a rear of the shoe.

125. The shoe of claim **122**, wherein the void is visible at least in part from outside the shoe through the at least one opening in the sidewall.

126. The shoe of claim **122**, wherein the lower surface of the plate is visible at least in part from outside the shoe through the at least one opening in the sidewall.

127. The shoe of claim **122**, wherein the interior surface of the sidewall is visible at least in part from outside the shoe through the at least one opening in the sidewall.

128. The shoe of claim **122**, wherein at least one portion of a cross section of the plate perpendicular to a major axis of the shoe defines a curve in a direction generally from a medial side of the shoe to a lateral side of the shoe, at least one portion of a cross section of the plate parallel to the major axis of the shoe defining a curve in a direction generally from a front of the shoe to a back of the shoe.

129. The shoe of claim **122**, wherein the at least one non-planar portion has a maximum linear dimension less than the greatest width of the bottom surface along a line perpendicular to a major axis of the shoe.

130. The shoe of claim **122**, wherein the bottom surface includes an outsole material that is ground engaging, the rear sole including midsole material above the outsole material, at least a portion of the midsole material above the at least one non-planar portion being thinner than the midsole material above the at least one substantially planar portion of the bottom surface of the rear sole.

131. The shoe of claim **122**, wherein the plate has at least one opening therein.

132. The shoe of claim **131**, wherein the at least one opening has a center located beneath the approximate center of the heel of the user.

133. The shoe of claim **132**, wherein the plate has multiple elongated cut-out portions therethrough.

134. The shoe of claim **133**, wherein the elongated cut-out portions are oriented around the center of the opening.

135. The shoe of claim **134**, wherein the elongated cut-out portions are evenly spaced around the center of the opening.

136. The shoe of claim **135**, wherein the elongated cut-out portions have a length and are oriented around the center of the opening such that the length is in a direction away from the center of the opening and toward the periphery of the plate.

137. The shoe of claim **136**, wherein a mid-longitudinal axis along the length of the elongated cut-out portions passes through the approximate center of the opening.

138. The shoe of claim 122, wherein a portion of the interior portion of the plate is thinner than a portion of the peripheral portions of the plate.

139. The shoe of claim 137, wherein the elongated cut-out portions are spaced around the center of the opening in a star-like pattern.

140. The shoe of claim 127, wherein the plate has six elongated cut-out portions around the center of the opening, the cut-out portions being oriented around the center of the opening in 60-degree increments.

141. The shoe of claim 131, wherein the at least one opening in the plate is at least in part visible from outside the shoe.

142. The shoe of claim 122, wherein the non-planar portion of the ground-engaging portion of the bottom surface of the rear sole includes an interior edge, the interior edge being located proximate an opening in the ground-engaging portion of the bottom surface.

143. The shoe of claim 142, wherein the interior edge is at least in part curved.

144. The shoe of claim 142, wherein the interior edge is at least in part arc-shaped.

145. The shoe of claim 142, wherein the interior edge defines at least a portion of a circle.

146. The shoe of claim 142, wherein the opening is substantially circular in shape.

147. The shoe of claim 142, wherein the rear sole has an interior sidewall adjacent and extending upwardly from the interior edge of the non-planar portion of the ground-engaging portion of the bottom surface.

148. The shoe of claim 142, wherein the interior edge defines a thickness of a layer of an outsole material, the outsole layer having an upper surface and a lower surface, the upper surface contacting another portion of the rear sole and the lower surface comprising at least a portion of the bottom surface of the rear sole.

149. The shoe of claim 142, wherein the opening in the ground-engaging portion of the bottom surface exposes a wall that defines, at least in part, a truncated cone.

150. The shoe of claim 122, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion along at least a substantial portion of the peripheral portions.

151. The shoe of claim 122, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion at a point along a medial side and at a point along a lateral side of the shoe.

152. The shoe of claim 122, wherein a forward facing portion and a rearward facing portion of the peripheral portions of the flexible plate are restrained from movement relative to the interior portion.

153. The shoe of claim 122, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion both at a point along a medial side and at a point along a lateral side of the shoe and along a forward facing portion and a rearward facing portion of the peripheral portions of the flexible plate.

154. The shoe of claim 122, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion both along at least a portion of a medial side and at least a portion of a lateral side of the shoe and on at least a portion of a forward facing portion and at least a portion of a rearward facing portion of the peripheral portions of the flexible plate.

155. The shoe of claim 122, wherein at least one of the peripheral portions of the plate being restrained from movement is along the upper surface of the plate and at least one of the peripheral portions of the plate being restrained from movement is along the lower surface of the plate.

156. The shoe of claim 155, wherein the peripheral portions are both toward the front of the shoe.

157. The shoe of claim 155, wherein the peripheral portions are both toward the back of the shoe.

158. The shoe of claim 155, wherein the peripheral portions are both on the lateral side of the shoe.

159. The shoe of claim 155, wherein the peripheral portions are both on the medial side of the shoe.

160. The shoe of claim 155, wherein the peripheral portions of the upper and lower surfaces are proximate one another.

161. The shoe of claim 160, where the capable of being deflected interior portion is located between the peripheral portions of the upper and lower surfaces and a point beneath a central portion of the heel region of the upper.

162. A shoe comprising:

an upper having a heel region and an arch region;

a rear sole having a rearward portion and an opposite forward portion connected below the heel region, the rear sole having a bottom surface, at least a portion of which is ground engaging, the bottom surface including at least one substantially planar portion and at least two portions non-planar with the at least one substantially planar portion, the non-planar portions being positioned proximate the perimeter of the rear sole and separated from each other by other portions of the bottom surface, each of the non-planar portions being inclined upwardly from another portion of the bottom surface in a direction toward the perimeter of the rear sole, one of the at least two non-planar portions being proximate the rearward portion of the rear sole, and the other of the at least two non-planar portions being proximate the forward portion of the rear sole;

a flexible plate having upper and lower surfaces and supported between at least a portion of the rear sole and at least a portion of the heel region of the upper, peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a direction substantially perpendicular to a major axis of the shoe so that the interior portion of the plate is capable of being deflected relative to the peripheral portions in a direction substantially perpendicular to the major axis of the shoe;

an opening in the bottom surface of the rear sole located beneath the interior portion of the plate to expose the interior portion of the plate from outside of the shoe; and

an arch bridge integral with the plate, the arch bridge extending from a position proximate a forward portion of the plate, forward beneath at least a portion of the arch region of the upper, the arch bridge having a bottom surface that is at least in part visible from outside of the shoe.

163. The shoe of claim 162, further including at least one wall proximate at least a portion of the peripheral portions of the plate, the at least one wall being integral with the plate and extending in a downwardly direction from the plate, the downwardly extending wall contacting at least a portion of the rear sole, at least a portion of the downwardly extending wall being visible from outside of the shoe.

164. The shoe of claim 163, further including at least one wall proximate at least a portion of the peripheral portions of the plate, the at least one wall being integral with the plate and extending in an upwardly direction from the plate, at

least a portion of the upwardly extending wall being visible from outside of the shoe..

165. The shoe of claim **162**, further including at least one wall proximate at least a portion of the peripheral portions of the plate, the at least one wall being integral with the plate and extending in an upwardly direction from the plate, at least a portion of the upwardly extending wall being visible from outside of the shoe.

166. The shoe of claim **162**, wherein a substantial portion of the bottom surface of the arch bridge is visible from outside of the shoe.

167. The shoe of claim **162**, wherein the bottom surface of the arch bridge is visible on a line perpendicular to a major axis of the shoe across a width of the arch bridge.

168. The shoe of claim **162**, wherein the arch bridge has proximate at least one of a medial side of the shoe and a lateral side of the shoe at least one wall integral with the arch bridge and extending in an upwardly direction.

169. The shoe of claim **168**, wherein at least a portion of the upwardly extending wall of the arch bridge is connected to the arch region of the upper.

170. The shoe of claim **168**, wherein at least a portion of the upwardly extending wall of the arch bridge is visible from outside of the shoe.

171. The shoe of claim **170**, wherein the arch bridge has proximate at least one of a medial side of the shoe and a lateral side of the shoe at least one wall integral with the arch bridge and extending in a downwardly direction, at least a portion of the downwardly extending wall of the arch bridge being visible from outside of the shoe.

172. The shoe of claim **162**, wherein the arch bridge has proximate at least one of a medial side of the shoe and a lateral side of the shoe at least one wall integral with the arch bridge and extending in a downwardly direction, at least a portion of the downwardly extending wall of the arch bridge being visible from outside of the shoe.

173. The shoe of claim **168**, further including at least one wall proximate at least a portion of the peripheral portions of the plate, the at least one wall being integral with the plate and extending in an upwardly direction from the plate.

174. The shoe of claim **173**, wherein the upwardly extending wall of the arch bridge is adjacent the upwardly extending wall of the plate.

175. The shoe of claim **173**, wherein the upwardly extending wall of the arch bridge is integral with the upwardly extending wall of the plate.

176. The shoe of claim **175**, wherein at least a portion of the upwardly extending wall of the arch bridge and at least a portion of the upwardly extending wall of the plate are visible from outside of the shoe.

177. The shoe of claim **162**, wherein further comprising at least one sidewall above at least a portion of the bottom surface of the rear sole, the at least one sidewall having at least one hole therethrough located on at least one of a lateral side, a medial side, and a rear of the shoe.

178. The shoe of claim **177**, wherein the at least one hole includes at least two holes, at least one of the at least two holes being on the medial side of the shoe and at least one of the at least two holes being on the lateral side of the shoe.

179. The shoe of claim **162**, wherein a substantial portion of the peripheral portions of the flexible plate are restrained from movement relative to the interior portion of the flexible plate.

180. The shoe of claim **162**, wherein the flexible plate has substantially its entire peripheral portion restrained.

181. The shoe of claim **162**, wherein the peripheral portions of the flexible plate being restrained from movement relative to the interior portion are at a point along a medial side and at a point along a lateral side of the shoe.

182. The shoe of claim **162**, wherein a forward facing portion and a rearward facing portion of the peripheral portions of the flexible plate are restrained from movement relative to the interior portion.

183. The shoe of claim **162**, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion both at a point along a medial side and a lateral side of the shoe and along a forward facing portion and a rearward facing portion of the peripheral portion of the flexible plate.

184. The shoe of claim **162**, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion both along at least a portion of a medial side and a lateral side of the shoe and on at least a portion of a forward facing portion and a rearward facing portion of the peripheral portion of the flexible plate.

185. The shoe of claim **162**, wherein at least one of the peripheral portions of the plate being restrained from movement is along the upper surface of the plate and at least one of the peripheral portions of the plate being restrained from movement is along the lower surface of the plate.

186. The shoe of claim **185**, wherein the peripheral portions are both toward the front of the shoe.

187. The shoe of claim **185**, wherein the peripheral portions are both toward the back of the shoe.

188. The shoe of claim **185**, wherein the peripheral portions are both on the lateral side of the shoe.

189. The shoe of claim **185**, wherein the peripheral portions are both on the medial side of the shoe.

190. The shoe of claim **185**, wherein the peripheral portions of the upper and lower surfaces are proximate one another.

191. The shoe of claim **190**, wherein the capable of being deflected interior portion is located between the peripheral portions of the upper and lower surfaces and a point beneath a central portion of the heel region of the upper.

192. A shoe comprising:

an upper having a heel region,

a rear sole secured below the heel region of the upper; and

a flexible plate having upper and lower surfaces and supported between at least a portion of the rear sole and at least a portion of the heel region of the upper;

at least a portion of the periphery of the plate being restrained from movement in a substantially vertical direction relative to an interior portion so that the interior portion of the plate is capable of being deflected relative to at least a portion of the restrained periphery in a substantially vertical direction; and

supporting structure located proximate the plate having at least one wall extending in a downward direction to at least partially define a recess, at least a portion of the rear sole secured in the recess of the supporting structure.

193. The shoe of claim **192**, wherein the interior portion of the plate is positioned over a void.

194. The shoe of claim **193**, wherein at least one portion of a cross-section of the plate parallel to the major axis of the shoe defines a curve in a direction generally from a front of the shoe to a back of the shoe.

195. The shoe of claim **194**, wherein the plate has an upper surface with at least two convex portions, at least a portion of the upper surface being concave, the concave portion of the upper surface being located between the two convex portions of the upper surface.

196. The shoe of claim 195, wherein the portion of the periphery of the plate being restrained from movement relative to the interior portion includes at at least two spaced apart points along a medial side of the shoe and at at least two spaced apart points along a lateral side of the shoe, the interior portion of the plate being located above a point between the at least two points along the medial side of the shoe and the at least two points along the lateral side of the shoe and beneath the approximate center of the users heel.

197. The shoe of claim 196, wherein upon the deflection of the interior portion of the plate, the at least two points along the medial side of the shoe and the at least two points along the lateral side of the shoe are displaceable in a direction substantially parallel to the ground.

198. The shoe of claim 196, wherein the upper has an arch region, and further comprising an arch bridge integral with the plate, the arch bridge extending from a position proximate a forward portion of the plate, forward beneath at least a portion of the arch region of the upper, the arch bridge having a bottom surface that is at least in part visible from outside of the shoe.

199. The shoe of claim 198, further comprising at least one sidewall above at least a portion of the bottom surface of the rear sole, the at least one sidewall having at least one hole therethrough located on at least one of a lateral side, a medial side, and a rear of the shoe.

200. The shoe of claim 199, further comprising at least one wall proximate at least a portion of the periphery of the plate and extending in at least one of an upwardly direction and a downwardly direction from the plate, the at least one wall being integral with the plate.

201. The shoe of claim 200, wherein at least one portion of the periphery of the plate being restrained from movement is along the upper surface of the plate and at least one other portion of the periphery of the plate being restrained from movement is along the lower surface of the plate.

202. The shoe of claim 201, wherein the portions of the periphery of the upper and lower surfaces being restrained from movement are proximate one another.

203. The shoe of claim 202, where the capable of being deflected interior portion is located between the portions of the periphery of the upper and lower surfaces being restrained and a point beneath a central portion of the heel region of the upper.

204. A shoe comprising:

an upper having a heel region;

a rear sole secured below the heel region and having rearward portion, the rear sole further having a bottom surface at least a portion of which is ground engaging, the ground-engaging portion of the bottom surface including at least one substantially planar portion and at least one portion non-planar with the at least one substantially planar portion, the at least one non-planar portion being positioned proximate a perimeter of the bottom surface and inclined upwardly in a direction toward the perimeter of the bottom surface from another portion of the bottom surface, the at least one non-planar portion having an outer edge coincident with the perimeter of the bottom surface and being located proximate the rearward portion of the rear sole;

a flexible plate having upper and lower surfaces and positioned between at least a portion of the rear sole and at least a portion of the heel region of the upper, peripheral portions of the plate being restrained from movement relative to an interior portion of the plate in a direction substantially perpendicular to a major axis of the shoe so that the interior portion of the plate is capable of being deflected relative to the peripheral portions in a direction substantially perpendicular to the major axis of the shoe, at least a portion of at least one cross-section of the plate defining a curve, the interior portion of the plate being positioned over a void, and the lower surface of the plate being at least in part visible from outside of the shoe, the plate having at least one opening therein, the at least one opening having a center located beneath the approximate center of the user's heel; and

a sidewall that includes midsole material located beneath the plate, the sidewall having an exterior surface that is at least in pad visible from outside the shoe and an interior surface that at least partially defines the void, the sidewall further having at least one opening therethrough on at least one of a lateral side of the shoe, a medial side of the shoe, and a rear of the shoe.

205. The shoe of claim 204, wherein the at least one opening in the sidewall is on both a medial side of the shoe and a lateral side of the shoe.

206. The shoe of claim 204, wherein the at least one opening in the sidewall is on both a medial side of the shoe and a lateral side of the shoe, and on a rear of the shoe.

207. The shoe of claim 204, wherein the void is visible at least in part from outside the shoe through the at least one opening in the sidewall.

208. The shoe of claim 204, wherein the lower surface of the plate is visible at least in part from outside the shoe through the at least one opening in the sidewall.

209. The shoe of claim 204, wherein the interior surface of the sidewall is visible at least in part from outside the shoe through the at least one opening in the sidewall.

210. The shoe of claim 204, wherein the at least one non-planar portion has a maximum linear dimension less than the greatest width of the bottom surface along a line perpendicular to a major axis of the shoe.

211. The shoe of claim 204, wherein the bottom surface includes an outsole material that is ground engaging, the rear sole including midsole material above the outsole material, at least a portion of the midsole material above the at least one non-planar portion being thinner than the midsole material above the at least one substantially planar portion of the bottom surface of the rear sole.

212. The shoe of claim 204, wherein the plate has multiple elongated cut-out portions therethrough.

213. The shoe of claim 212, wherein the elongated cut-out portions are oriented around the center of the opening.

214. The shoe of claim 213, wherein the elongated cut-out portions are evenly spaced around the center of the opening.

215. The shoe of claim 214, wherein the elongated cut-out portions have a length and are oriented around the center of the opening such that the length is in a direction away from the center of the opening and toward the periphery of the plate.

216. The shoe of claim 215, wherein a mid-longitudinal axis along the length of the elongated cut-out portions passes through the approximate center of the opening.

217. The shoe of claim 204, wherein a portion of the interior portion of the plate is thinner than a portion of the peripheral portions of the plate.

218. The shoe of claim 216, wherein the elongated cut-out portions are spaced around the center of the opening in a star-like pattern.

219. The shoe of claim 216, wherein the plate has six elongated cut-out portions around the center of the opening, the cut-out portions being oriented around the center of the opening in 60-degree increments.

220. The shoe of claim 204, wherein the at least one opening in the plate is at least in part visible from outside the shoe.

221. The shoe of claim 204, wherein the non-planar portion of the ground-engaging portion of the bottom surface of the rear sole includes an interior edge, the interior edge being located proximate an opening in the ground-engaging portion of the bottom surface.

222. The shoe of claim 221, wherein the interior edge is at least in part curved.

223. The shoe of claim 221, wherein the interior edge is at least in part arc-shaped.

224. The shoe of claim 221, wherein the interior edge defines at least a portion of a circle.

225. The shoe of claim 221, wherein the opening is substantially circular shape.

226. The shoe of claim 221, wherein the rear sole has an interior sidewall adjacent and extending upwardly from the interior edge of the non-planar portion of the ground-engaging portion of the bottom surface.

227. The shoe of claim 221, wherein the interior edge defines a thickness of a layer of an outsole material, the outsole layer having an upper surface and a lower surface, the upper surface contacting another portion of the rear sole and the lower surface comprising at least a portion of the bottom surface of the rear sole.

228. The shoe of claim 221, wherein the opening in the ground-engaging portion of the bottom surface exposes a wall that defines, at least in part, a truncated cone.

229. The shoe of claim 204, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion at a point along a medial side and at a point along a lateral side of the shoe.

230. The shoe of claim 204, wherein a forward facing portion and a rearward facing portion of the peripheral portions of the flexible plate are restrained from movement relative to the interior portion.

231. The shoe of claim 204, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion both at a point along a medial side and at a point along a lateral side of the shoe and along a forward facing portion and a rearward facing portion of the peripheral portions of the flexible plate.

232. The shoe of claim 204, wherein the peripheral portions of the flexible plate are restrained from movement relative to the interior portion both along at least a portion of a medial side and at least a portion of a lateral side of the shoe and on at least a portion of a forward facing portion and at least a portion of a rearward facing portion of the peripheral portions of the flexible plate.

233. The shoe of claim 204, wherein at least one of the peripheral portions of the plate being restrained from movement is along the upper surface of the plate and at least one of the peripheral portions of the plate being restrained from movement is along the lower surface of the plate.

234. The shoe of claim 233, wherein the peripheral portions are both toward the front of the shoe.

235. The shoe of claim 233, wherein the peripheral portions are both toward the back of the shoe.

236. The shoe of claim 233, wherein the peripheral portions are both on the lateral side of the shoe.

237. The shoe of claim 233, wherein the peripheral portions are both on the medial side of the shoe.

238. The shoe of claim 233, wherein the peripheral portions of the upper and lower surfaces are proximate one another.

239. The shoe of claim 238, wherein the capable of being deflected interior portion is located between the peripheral portions of the upper and lower surfaces and a point beneath a central portion of the heel region of the upper.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,604,300 B2
DATED : August 12, 2003
INVENTOR(S) : David F. Meschan

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page,
Item [56], **References Cited**, OTHER PUBLICATIONS, insert the following:
-- AVIA 1989 Catalog excerpt.
AVIA Fall 1991 Footwear Catalog.
Runner's World 1989 Spring Shoe Survey (MIZ 135893 – MIZ 135902).
4 photographs of shoes sold in the United States prior to the filing date of the above-referenced application. --; and at the third reference, change "Etoni" to -- Etonic --.

Column 16,
Line 67, change "pad" to -- part --.

Column 17,
Line 11, change "non- planar" to -- non-planar --; and
Line 51, change "users" to -- user's --.

Column 18,
Line 47, change "pad" to -- part --.

Column 19,
Line 30, change "non- planar" to -- non-planar --.

Column 20,
Line 58, change "plate ,the" to -- plate, the --.

Column 21,
Line 5, change "non- planar" to -- non-planar --;
Line 12, change "sole." to -- sole, --; and
Line 32, change "non- planar" to -- non-planar --.

Column 24,
Line 6, change "pad" to -- part --.

Column 26,
Line 14, change "where" to -- wherein --.

Column 27,
Line 2, change "shoe.." to -- shoe. --; and
Line 51, delete "wherein".

Column 28,
Line 29, change "arc" to -- are --.

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,604,300 B2
DATED : August 12, 2003
INVENTOR(S) : David F. Meschan

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 29,
Line 9, change "users" to -- user's --; and
Line 40, change "where" to -- wherein --.

Column 30,
Line 13, change "pad" to -- part --.

Column 31,
Line 16, after "circular" insert -- in --.

Signed and Sealed this

Ninth Day of December, 2003

JAMES E. ROGAN
Director of the United States Patent and Trademark Office

Patent Appendix B

US006662471B2

(12) **United States Patent**
Meschan

(10) **Patent No.: US 6,662,471 B2**
(45) **Date of Patent: *Dec. 16, 2003**

(54) **ATHLETIC SHOE WITH IMPROVED HEEL STRUCTURE**

(75) Inventor: **David F. Meschan**, Greensboro, NC (US)

(73) Assignee: **Akeva, L.L.C.**, Greensboro, NC (US)

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/419,641**

(22) Filed: **Oct. 18, 1999**

(65) **Prior Publication Data**

US 2003/0208927 A1 Nov. 13, 2003

Related U.S. Application Data

(63) Continuation of application No. 09/149,142, filed on Sep. 8, 1998, now Pat. No. 5,970,628, which is a continuation of application No. 08/542,251, filed on Oct. 12, 1995, now Pat. No. 5,806,210.

(51) **Int. Cl.**[7] **A43B 13/28**

(52) **U.S. Cl.** ..... **36/27**; 36/28; 36/35 R

(58) **Field of Search** ..... 36/42, 39, 36 R, 36/36 A, 27, 31, 35 R, 15, 37, 69, 41, 36 C, 34 R, 25 R, 100, 107, 103, 105, 38

(56) **References Cited**

U.S. PATENT DOCUMENTS

48,682	A	7/1865	Hayward et al.	
221,592	A	11/1879	Mitchell et al.	
357,062	A *	2/1887	Buch	36/38
485,813	A	11/1892	Hooper	
537,492	A	4/1895	Smith	

(List continued on next page.)

FOREIGN PATENT DOCUMENTS

CH	434 029	10/1967
DE	648339	7/1937
DE	693 394	7/1940
DE	947054	7/1956
DE	2 154 951	5/1973
DE	2 742 138	3/1979
FR	533972	3/1922
GB	25728	11/1909
GB	63342	2/1911
GB	83342	2/1911
GB	229 884	3/1924
GB	1 540 926	2/1979
GB	2 144 024	2/1985
JP	62-41601	10/1987
JP	62-200904	12/1987
JP	5-18965	5/1993

OTHER PUBLICATIONS

Etonic Spring 1996 Footwear catalogue.
Mizuno Sport Shoe Catalog (1986).
Etonic Spring Sport Shoe Catalog; p. 4; (1993).
Expert Declaration of: Jerry D. Stubblefield dated Jul. 30, 2002.
AVIA 1989 Catalog excerpt.
AVIA Fall 1991 Footwear Catalog.

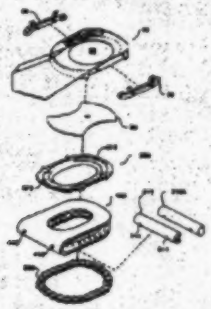
(List continued on next page.)

Primary Examiner—Ted Kavanaugh
(74) *Attorney, Agent, or Firm*—Martin & Ferraro, LLP

(57) **ABSTRACT**

A shoe includes a rear sole support for receiving a replaceable rear sole to provide longer wear. The shoe may also include a flexible plate supported by the rear sole support between the heel and the rear sole to reduce midsole compression and provide additional spring. A mounting member secures the rear sole to the rear sole support, and a locking member prevents rotation of the rear sole relative to the rear sole support during use. The replaceable rear sole and the flexible plate allow the shoe to be adapted to different desired performance characteristics depending upon the intended activity and terrain or playing surface.

32 Claims, 29 Drawing Sheets



U.S. PATENT DOCUMENTS

652,887	A	7/1900	Butterfield	
674,636	A	5/1901	Preston	
789,089	A	5/1905	Frank	
818,861	A	4/1906	Beck et al	
900,458	A	4/1911	Scholl	
1,046,815	A	12/1912	Lavrie	
1,062,338	A	5/1913	Kane	
1,088,426	A *	2/1914	Cocinetta	36/28
1,112,635	A	10/1914	May	
1,316,505	A	9/1919	O'Neill	
1,318,247	A	10/1919	Victor	
1,346,841	A	7/1920	Padden	
1,366,601	A	1/1921	Sellars	
1,371,339	A	3/1921	Arntz et al	
1,410,064	A	3/1922	Hunt	
1,439,757	A	12/1922	Redman	
1,439,758	A	12/1922	Redman	
1,444,677	A	2/1923	Fischer	
1,458,257	A	6/1923	Van Melle	
1,470,773	A	1/1924	Craig	
1,501,765	A	7/1924	Freese	
1,516,384	A	11/1924	Kamada	
1,542,174	A	6/1925	Robidoux	
1,611,024	A	12/1926	Grimaldi	
1,625,048	A *	4/1927	Hock	36/38
1,721,714	A	7/1929	Ross	
1,811,641	A	6/1931	Marcelle	
2,002,067	A	5/1935	Paterson	
2,003,646	A	6/1935	De Blasio	
2,078,341	A	4/1937	Berg	
2,119,807	A	6/1938	Farley	
2,148,974	A	2/1939	Wysowski	
2,208,280	A	7/1940	Hayden	
2,288,168	A	6/1942	Teo	
2,301,635	A	11/1942	Shepherd	
2,374,954	A	5/1945	Pipitone	
2,446,627	A	8/1948	Bier	
2,447,603	A *	8/1948	Snyder	36/38
2,491,280	A	12/1949	Roth	
2,501,302	A	3/1950	Vacanti	
2,508,318	A *	5/1950	Wallach	36/38
2,540,449	A	2/1951	Kaufmann	
2,556,842	A	6/1951	Gilmore	
2,617,134	A	8/1952	Langer	
2,628,430	A	2/1953	Rochlin	
2,707,341	A	5/1955	Romano	
2,745,197	A	5/1956	Holt	
2,806,302	A	9/1957	Sharpe	
2,998,661	A	9/1961	Israel	
3,083,478	A	4/1963	Rakus	
3,085,349	A	4/1963	Rubens	
3,087,266	A	4/1963	McKinley	
3,169,327	A	2/1965	Ishioka	
3,171,218	A	3/1965	D'Urbano	
3,208,163	A	9/1965	Rubens	
3,237,321	A	3/1966	McKinley	
3,271,895	A	9/1966	McAuliffe	
3,318,025	A	5/1967	Astelo	
3,432,158	A	3/1969	McMahon et al	
3,455,038	A	7/1969	Kaidan	
3,478,447	A	11/1969	Gilead	
3,514,879	A	6/1970	Frattallone	
3,566,489	A	3/1971	Morley	
3,593,436	A	7/1971	Victas	
3,646,697	A	2/1972	Gillikin	
3,664,041	A	5/1972	Frattallone	
3,775,874	A	12/1973	Frattallone	
3,782,010	A	1/1974	Frattallone	
3,804,098	A	4/1974	Hall	
3,928,881	A	12/1975	Bente	
3,988,840	A	11/1976	Minihane	
4,043,058	A	8/1977	Hollister et al	
4,062,132	A	12/1977	Klimaszewski	
4,067,123	A	1/1978	Minihane	
4,098,011	A	7/1978	Bowerman	
4,102,061	A	7/1978	Santisto	
4,168,585	A	9/1979	Gleichner	
4,214,384	A	7/1980	Gonzalez	
4,224,749	A	9/1980	Diaz-Cano	
4,258,480	A	3/1981	Famolare, Jr	
4,262,434	A	4/1981	Michelotti	
4,263,728	A	4/1981	Frezentese	
4,267,650	A	5/1981	Bayer	
4,288,929	A	9/1981	Norton et al.	
4,320,588	A	3/1982	Sottolana	
4,322,894	A	4/1982	Dykes	
4,322,895	A	4/1982	Hockerson	
4,363,177	A	12/1982	Borns	
4,372,068	A	2/1983	Stubblefield	
4,377,042	A	3/1983	Baier	
4,378,643	A	4/1983	Johnson	
4,391,048	A	7/1983	Lutz	
4,393,605	A	7/1983	Spung	
4,399,620	A	8/1983	Funck	
4,414,763	A	11/1983	Bente	
4,429,474	A	2/1984	Metro	
4,449,307	A	5/1984	Stubblefield	
4,455,765	A	6/1984	Sjoswand	
4,455,766	A	6/1984	Rubens	
4,486,964	A	12/1984	Rudy	
4,510,700	A	4/1985	Brown	
4,530,173	A	7/1985	Jesinsky, Jr.	
4,534,124	A	8/1985	Schnell	
4,541,185	A	9/1985	Chou	
4,546,556	A	10/1985	Stubblefield	
4,550,510	A	11/1985	Stubblefield	
4,561,195	A	12/1985	Ozeda et al.	
4,598,487	A	7/1986	Miserich	
4,606,139	A	8/1986	Silver	
4,608,768	A	9/1986	Cavanagh	
4,610,100	A	9/1986	Rhodes	
4,622,764	A	11/1986	Bosler	
4,638,575	A	1/1987	Illustrato	
4,642,917	A	2/1987	Ungar	
4,680,876	A	7/1987	Peng	
4,706,392	A	11/1987	Yang	
4,709,489	A	12/1987	Welter	
4,712,314	A	12/1987	Segoloff	
4,741,114	A	5/1988	Stubblefield	
4,745,693	A	5/1988	Brown	
4,756,095	A	7/1988	Lakic	
4,770,109	A	10/1988	Sacre	
4,778,717	A	10/1988	Fuchsman	
4,785,557	A	11/1988	Kelley et al.	
4,811,500	A	3/1989	Maccano	
4,815,221	A	3/1989	Diaz	
4,843,737	A	7/1989	Verderer	
4,845,863	A	7/1989	Yung-Mao	
4,860,861	A	9/1989	Noone	
4,875,300	A	10/1989	Kazr	
4,878,300	A	11/1989	Bogaty	
4,879,821	A	11/1989	Graham et al.	
4,881,329	A	11/1989	Crowley	
4,887,367	A	12/1989	Mackness et al.	
4,930,028	A	6/1990	Posachi	
4,979,319	A	12/1990	Hayes	
4,995,173	A	2/1991	Speer	
5,005,300	A	4/1991	Diaz et al.	
5,014,449	A	5/1991	Richard et al.	
RE33,648	E	7/1991	Brown	
5,052,130	A	10/1991	Barry et al.	

5,070,629	A	12/1991	Graham et al.	
5,083,385	A	1/1992	Halford	
5,086,574	A	2/1992	Bacchiocchi	
5,092,060	A	3/1992	Frachey et al.	
5,179,791	A	1/1993	Lain	
5,185,943	A	2/1993	Tong et al.	
5,191,727	A	3/1993	Barry et al.	
5,197,206	A	3/1993	Shorten	
5,224,277	A *	7/1993	Song Do	36/27
5,255,451	A	10/1993	Tong et al.	
5,319,866	A	6/1994	Foley et al.	
5,325,611	A	7/1994	Dyer et al.	
5,343,639	A	9/1994	Kilgore et al.	
5,353,523	A	10/1994	Kilgore et al.	
5,367,792	A	11/1994	Richard et al.	
5,381,608	A	1/1995	Claveria	
5,402,588	A	4/1995	Graham et al.	
5,425,184	A	6/1995	Lyden et al.	
5,435,079	A *	7/1995	Gallegos	36/38
5,469,638	A	11/1995	Crawford, III	
5,528,842	A	6/1996	Ricci et al.	
5,560,126	A	10/1996	Meschan et al.	
5,615,497	A	4/1997	Meschan	
5,722,186	A	3/1998	Brown	
5,806,210	A *	9/1998	Meschan	36/36 R
5,829,172	A	12/1998	Kaneko	
5,970,628	A *	10/1999	Meschan	36/42
6,568,102	B1 *	5/2003	Healy et al.	36/28

OTHER PUBLICATIONS

Declaration of Takaya Kimura (Civil Action File No. 1:00 CV 00978).

Mizuno 1985 Sports Shoe catalog excerpts (MIZJP 02524–02531).

Mizuno 1986 Sports Shoe catalog excerpts (MIZJP 02532–02537).

Mizuno 1987 Athletic Footwear catalog excerpts (MIZJP 02538–02546).

Mizuno 1988 Athletic Footwear catalog excerpts (MIZJP 02547–02549).

Mizuno 1991 All Line–Up catalog excerpts (MIZJP 02550–02556).

Mizuno 1992 Run–Bird All Line–Up catalog excerpts (MIZJP 02557–02559).

Mizuno 1993 All–Line–Up catalog excerpts (MIZJP 02560–02564).

Runner's World 1989 Spring Shoe Survey (MIZ 135893–MIZ 135902).

4 photographs of shoes sold in the United States prior to the filing date of the above–referenced application.

* cited by examiner

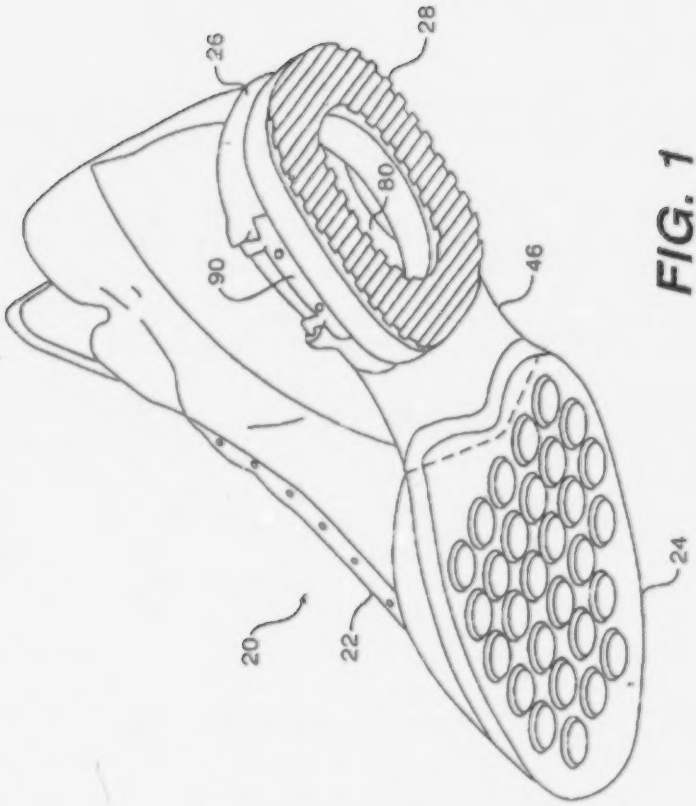


FIG. 1

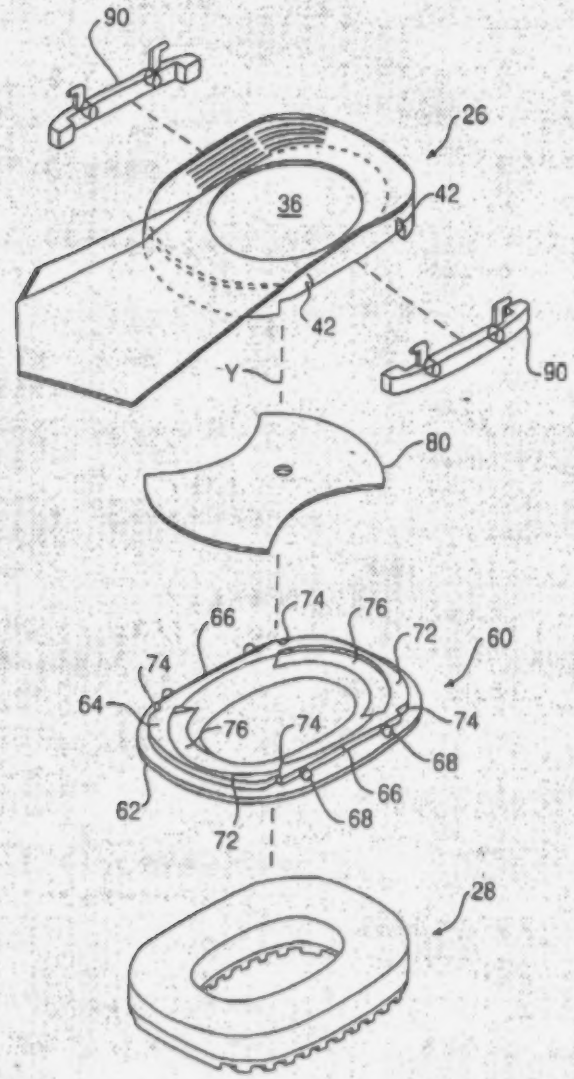


FIG. 2

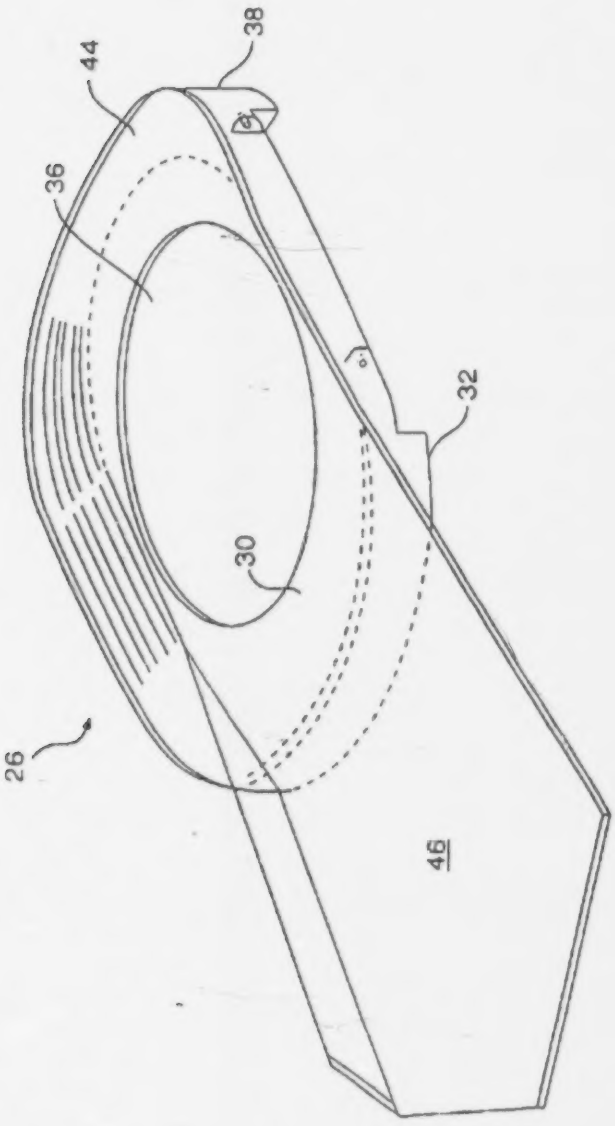


FIG. 3

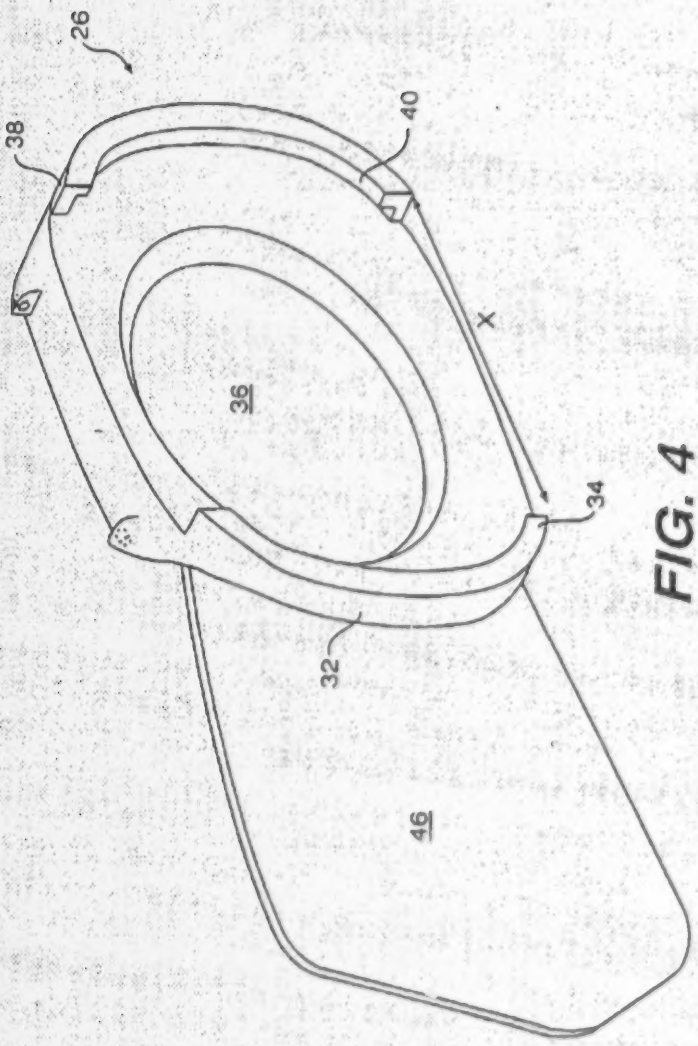


FIG. 4

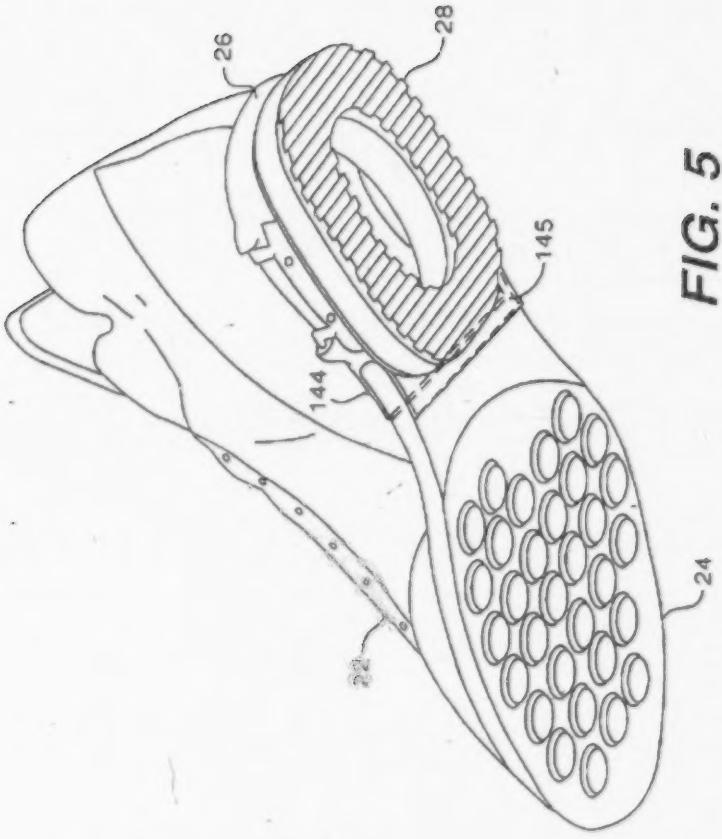


FIG. 5

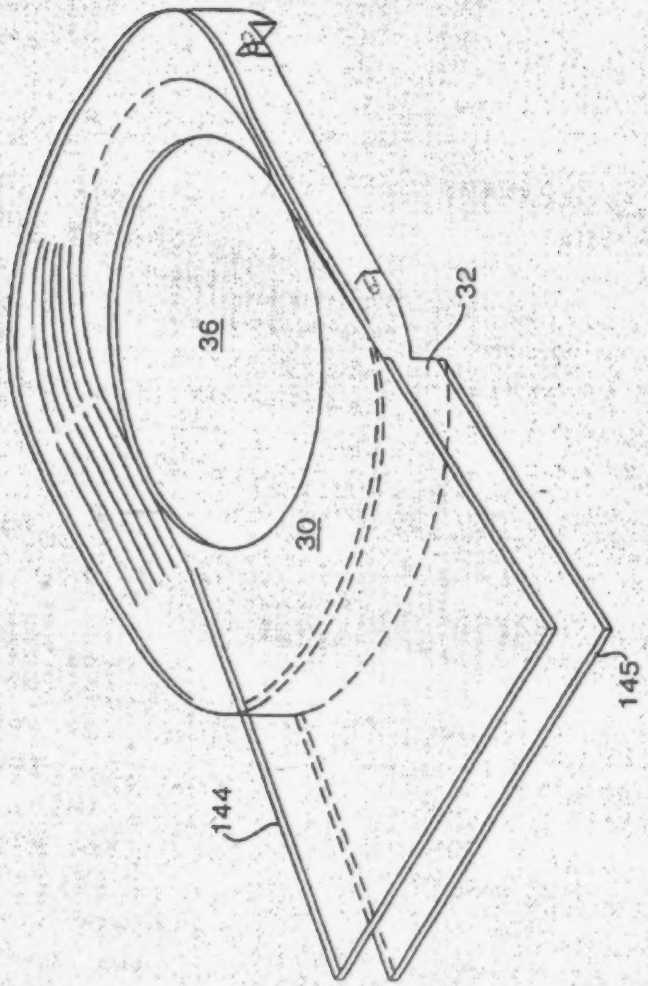


FIG. 6

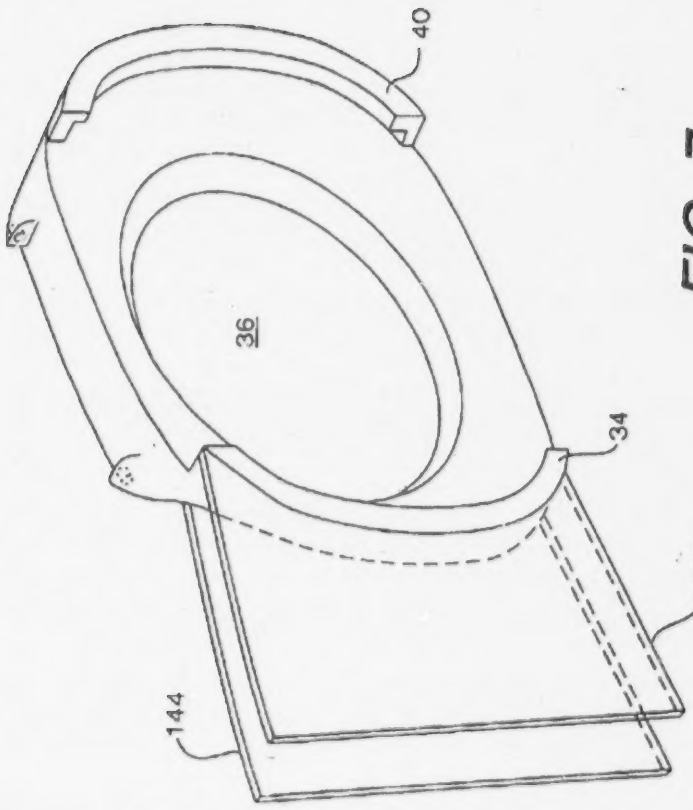


FIG. 7

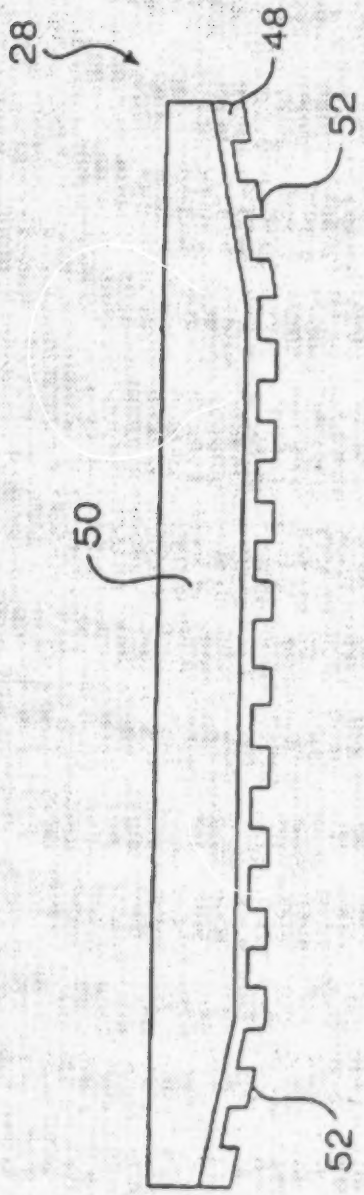


FIG. 8

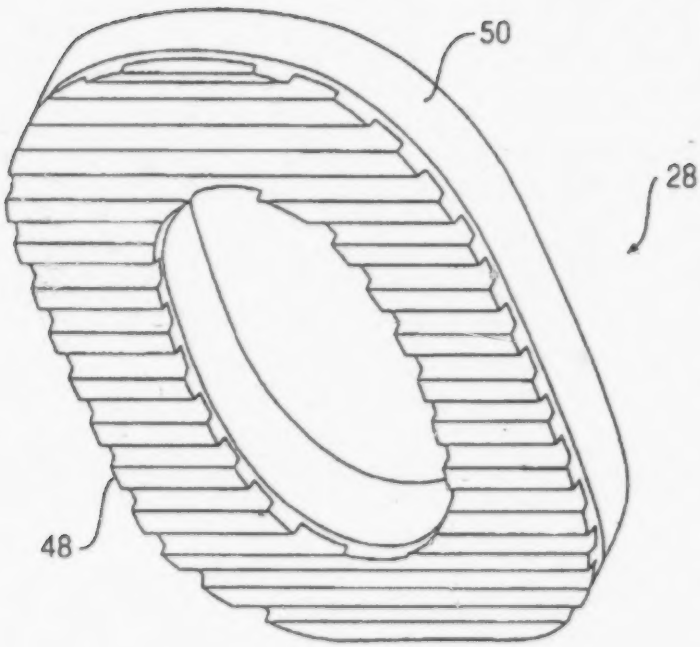


FIG. 9

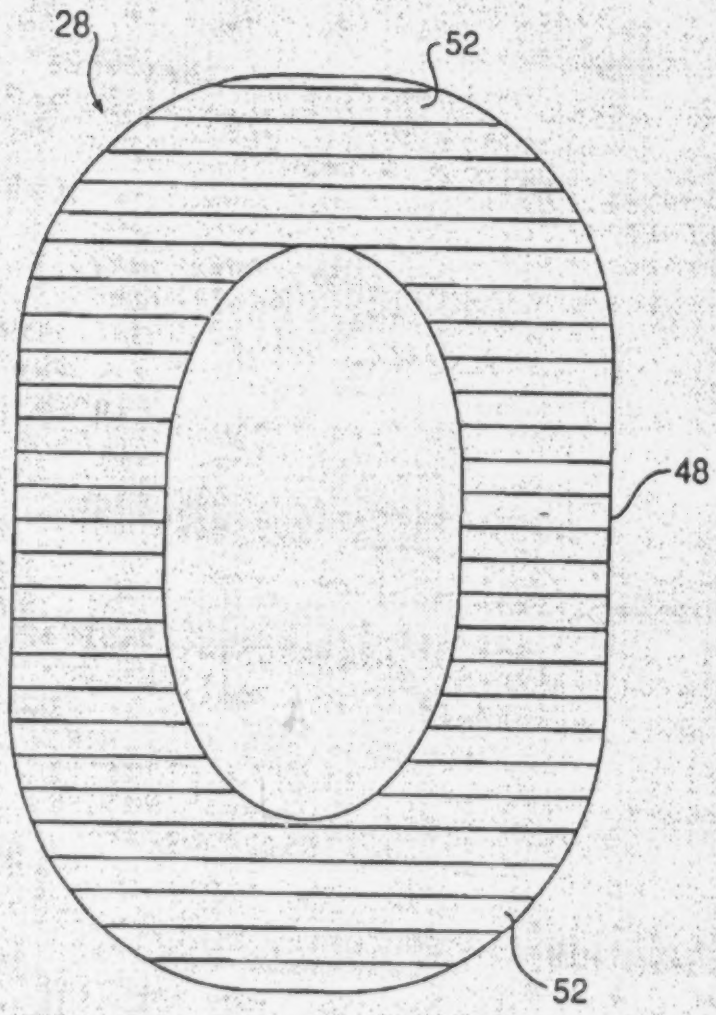


FIG. 10A

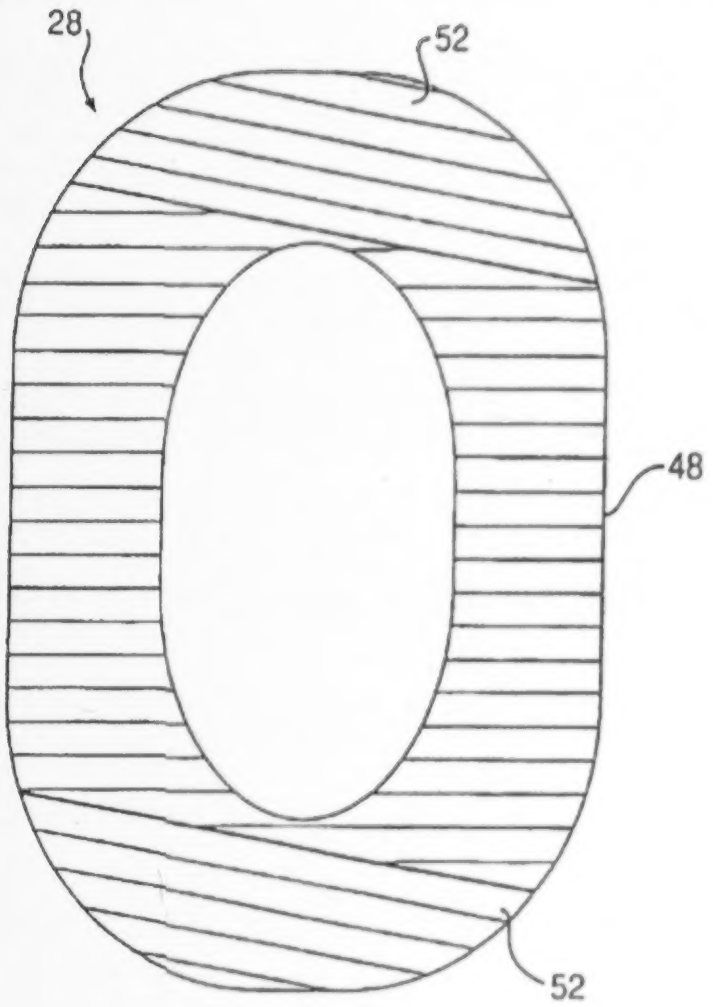


FIG. 10B

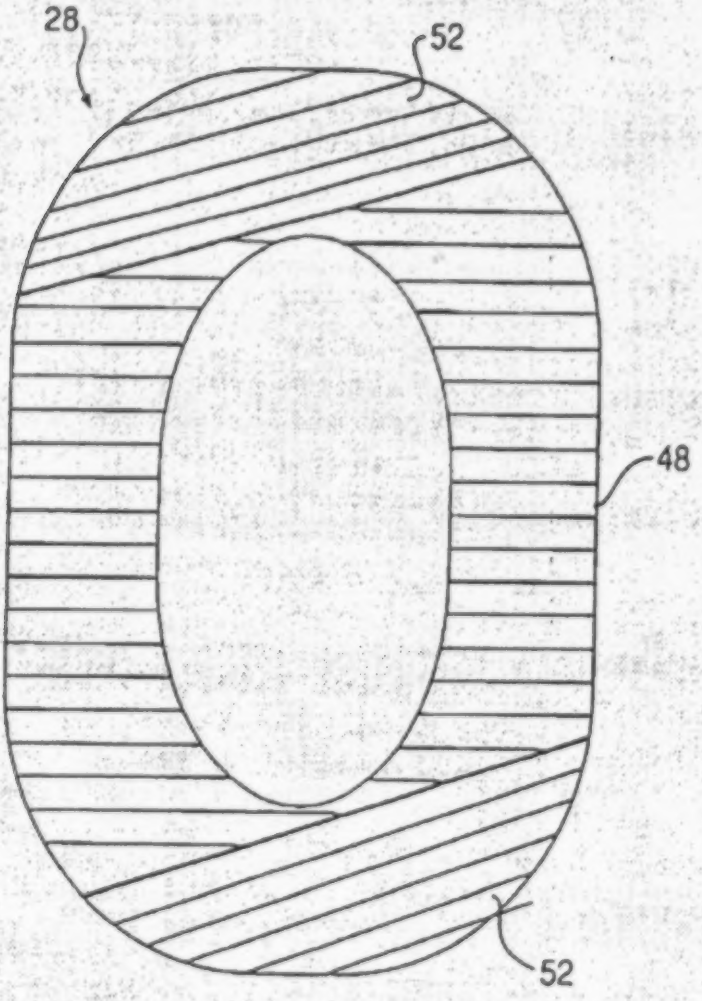


FIG. 10C

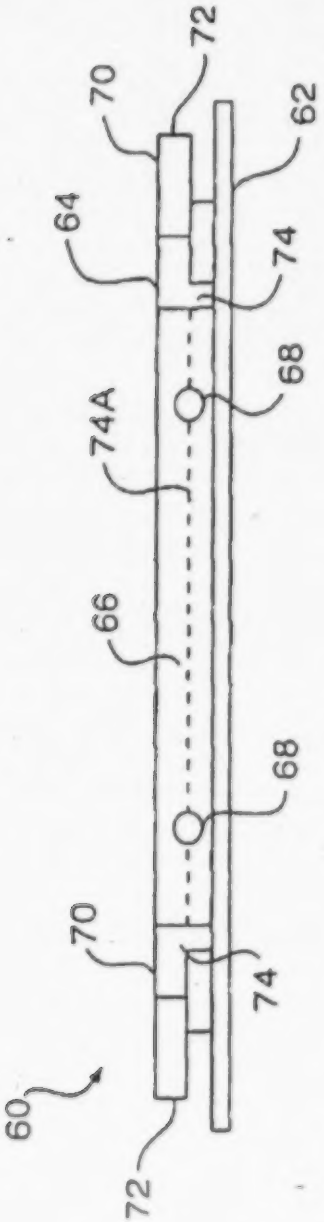


FIG. 11

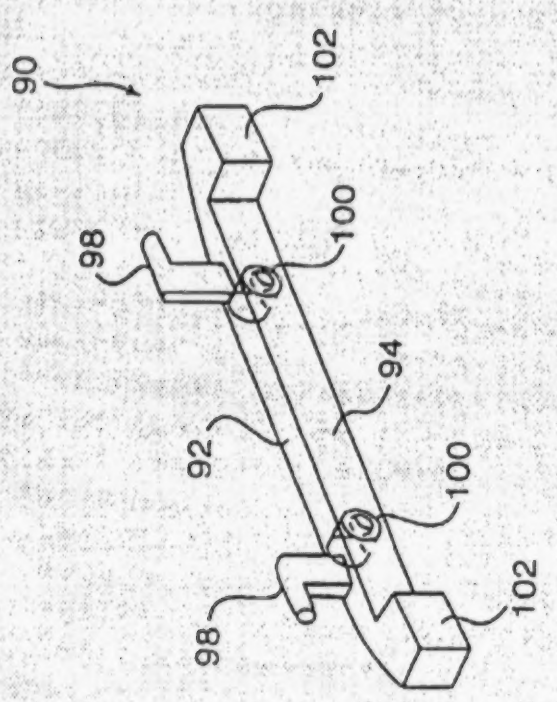


FIG. 12

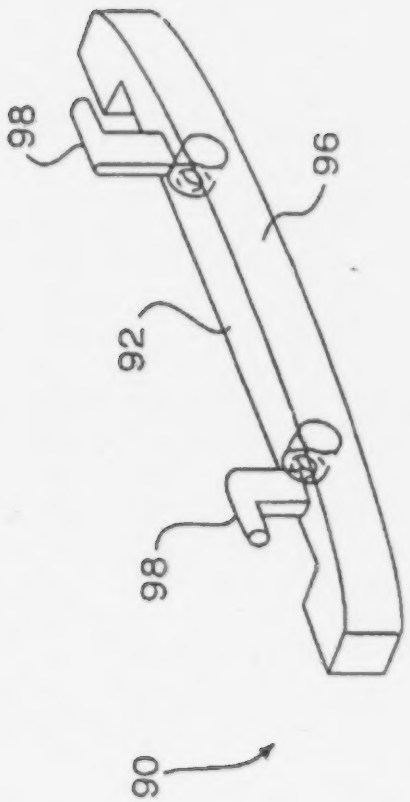


FIG. 13

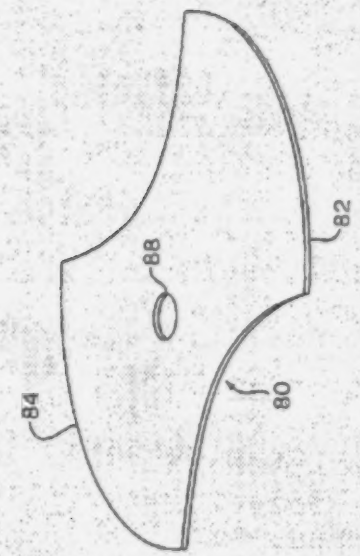


FIG. 14B

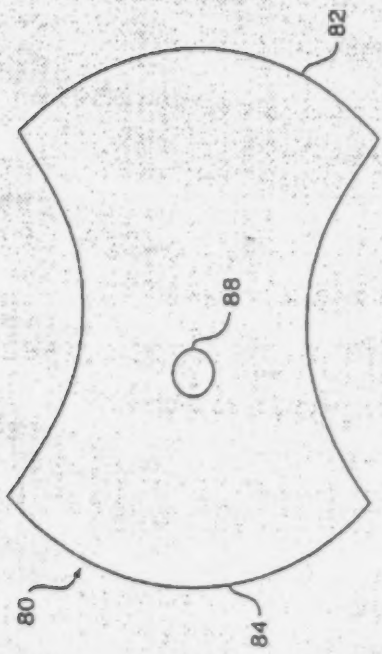


FIG. 14A

FIG. 14C

FIG. 15B

FIG. 15A

FIG. 15C

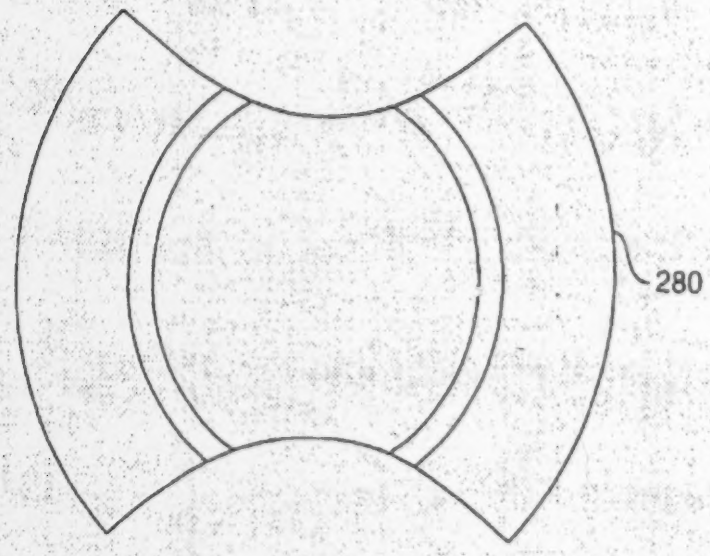


FIG. 16A

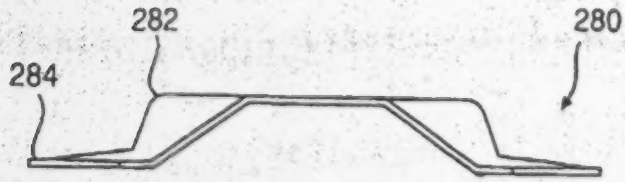


FIG. 16B

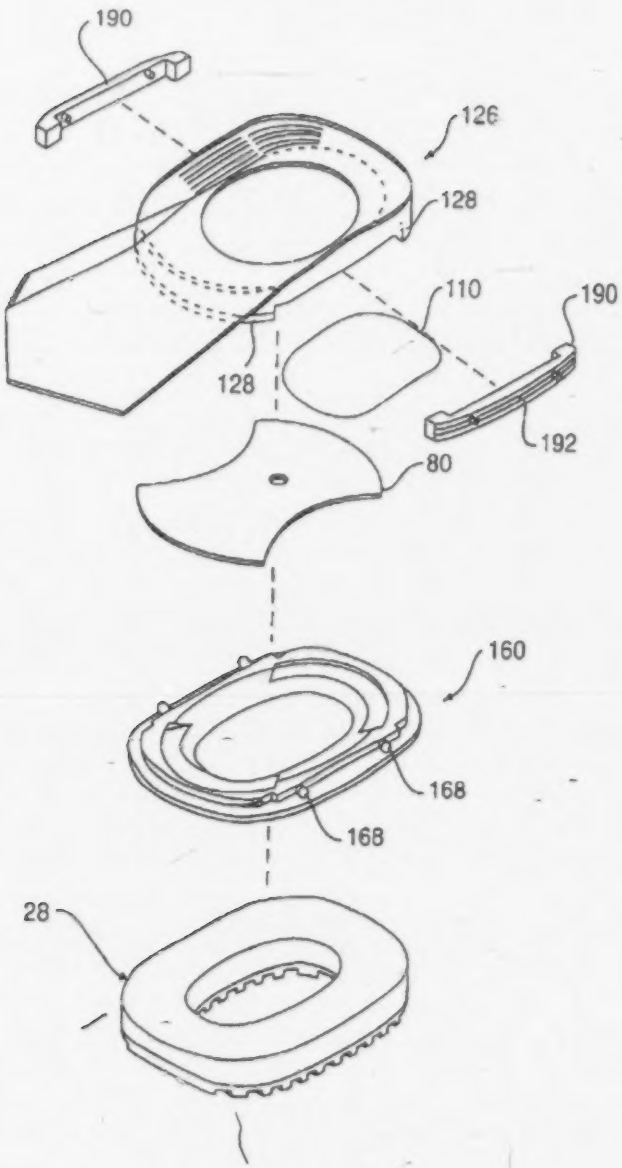


FIG. 17

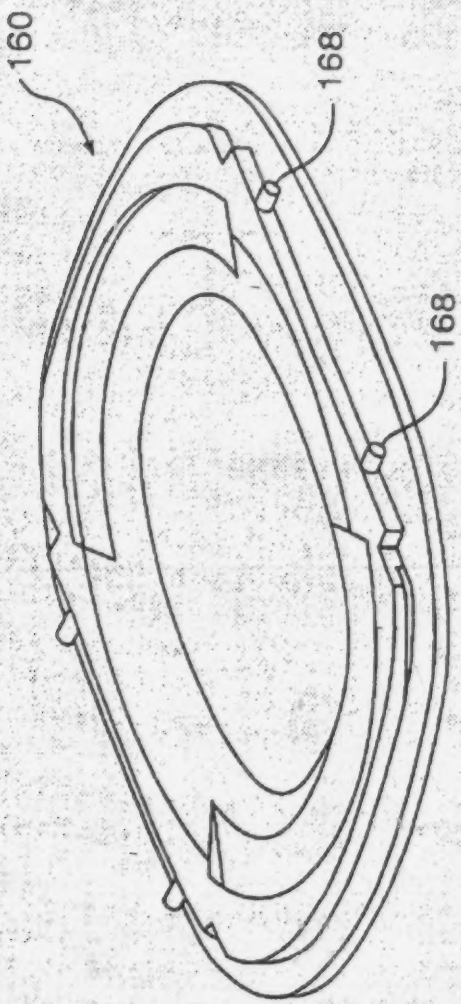


FIG. 18

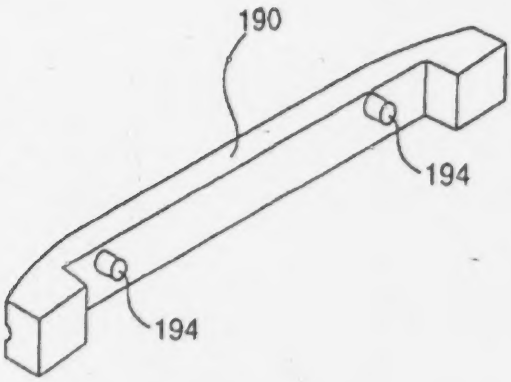


FIG. 19A

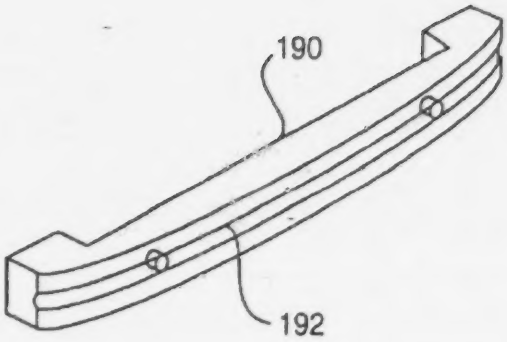


FIG. 19B

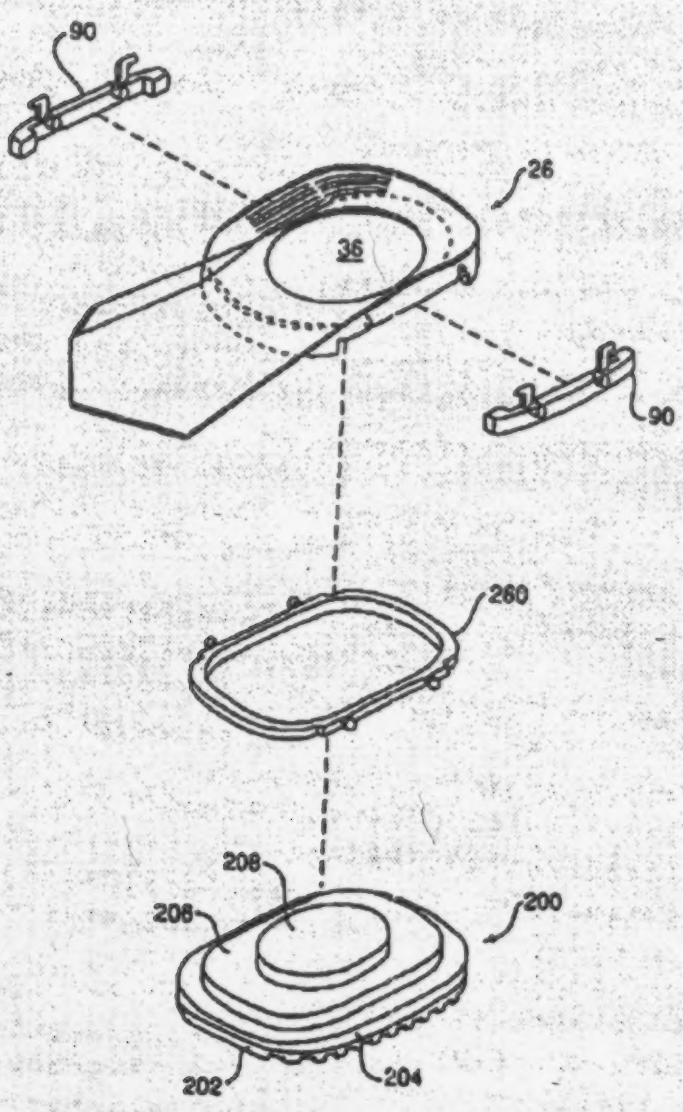
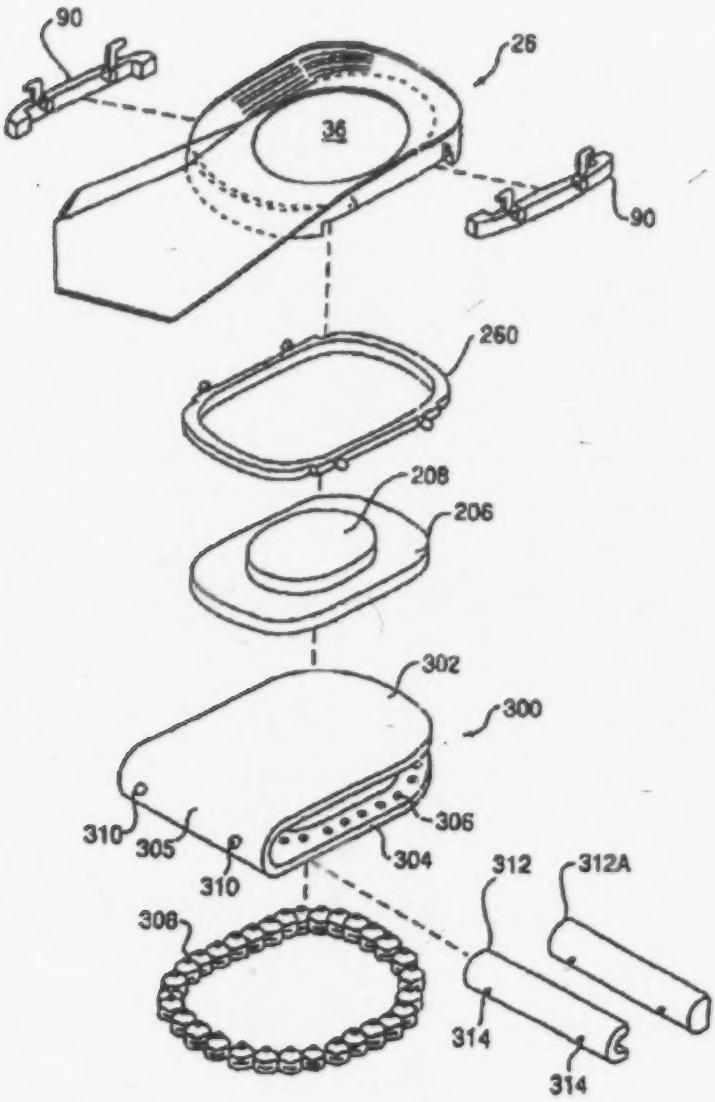


FIG. 20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312A
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FIG. 21

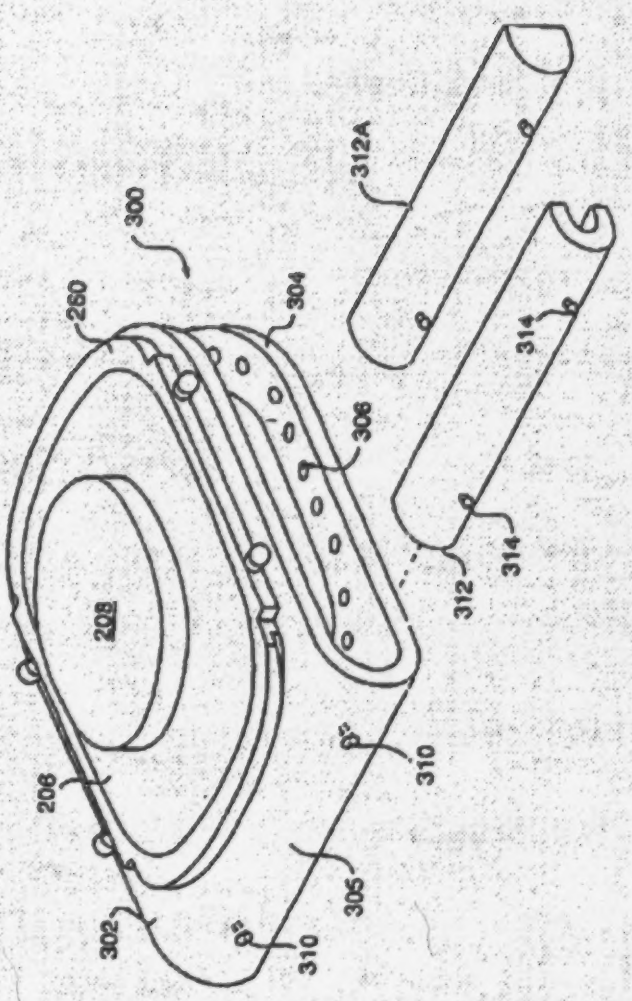

FIG. 22

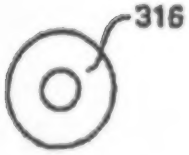

FIG. 23A

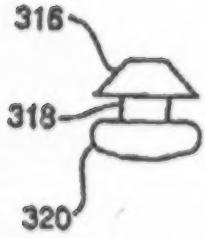

FIG. 23B

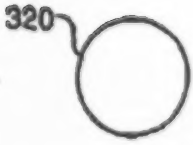

FIG. 23C

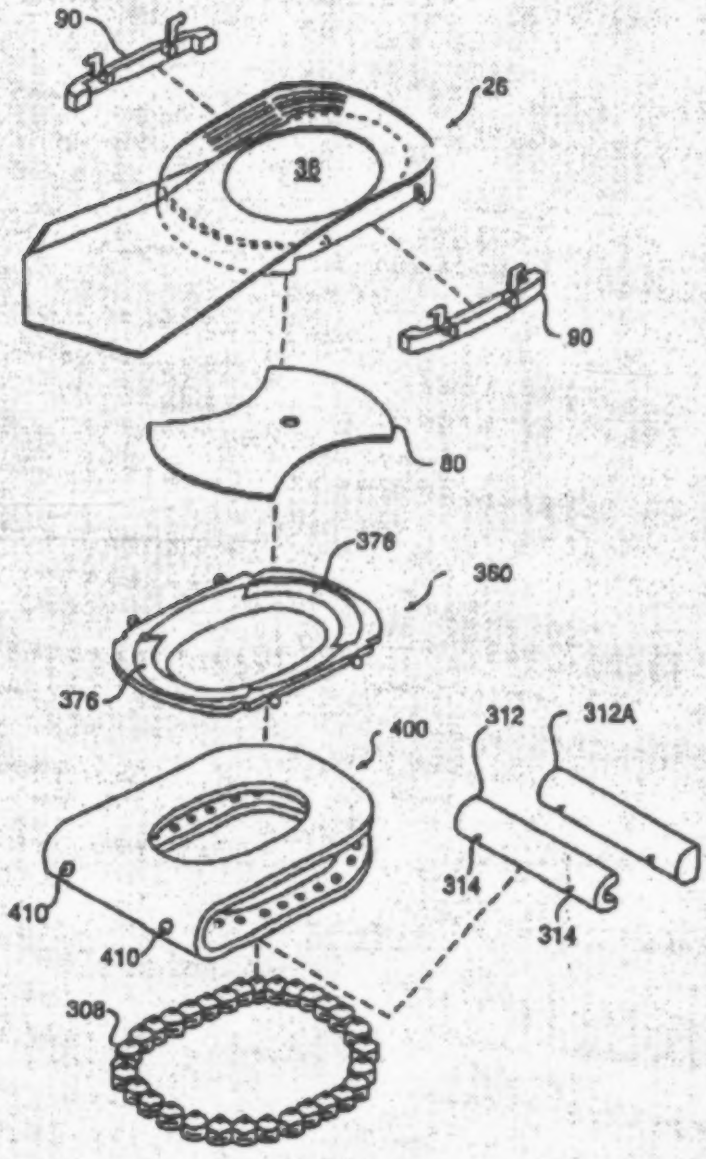

FIG. 24

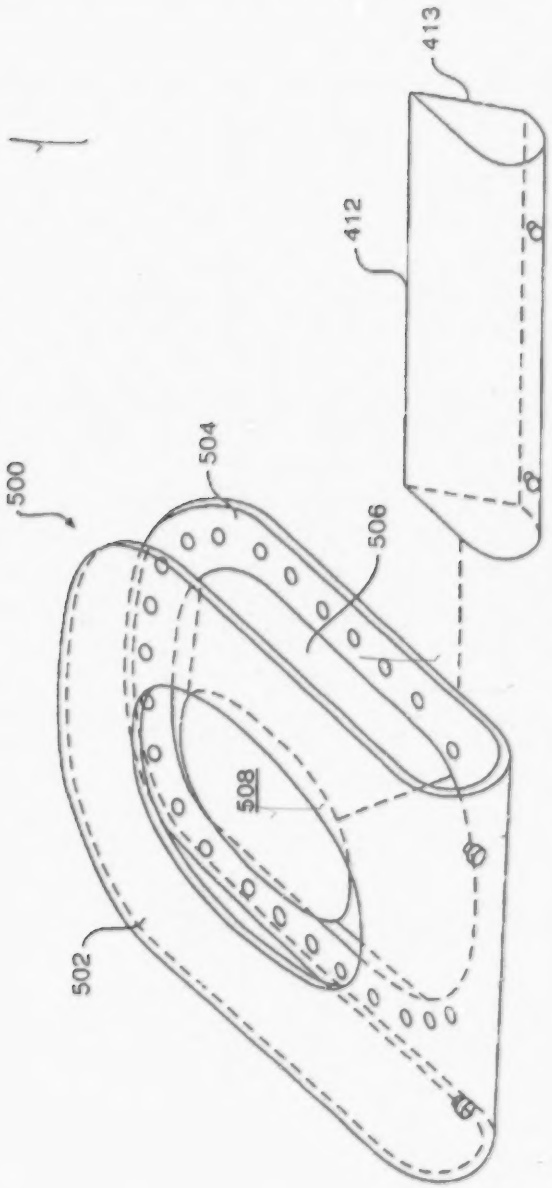

FIG. 25

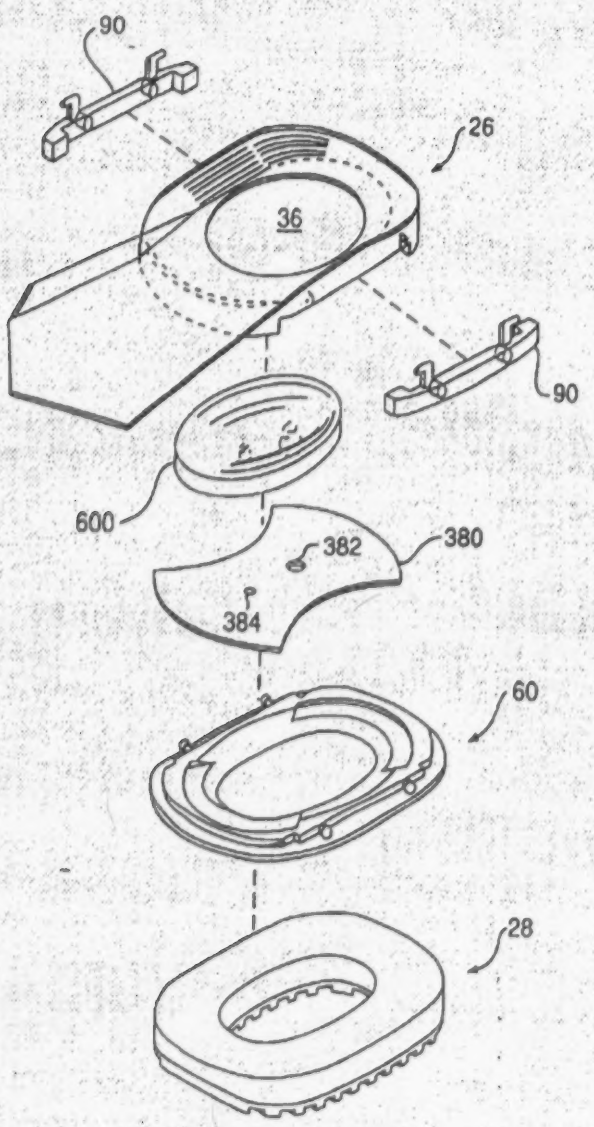

FIG. 26

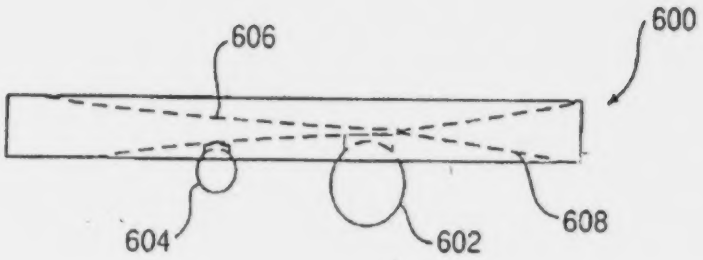

FIG. 27A

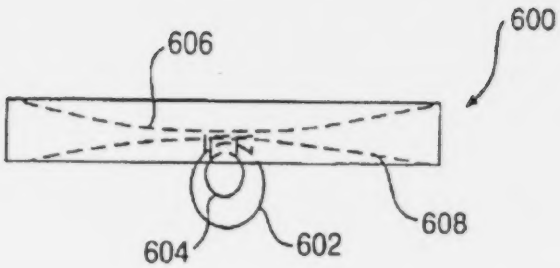

FIG. 27B

ATHLETIC SHOE WITH IMPROVED HEEL STRUCTURE

This is a continuation of application Ser. No. 09/149,142, filed Sep. 8, 1998 now U.S. Pat. No. 5,970,638 which is a continuation of Pat. No. 5,806,210 Ser. No. (08/542,251, filed Oct. 12, 1995) all of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to multi-purpose athletic shoes and, more particularly, to athletic shoes with interchangeable/detachable rear soles that provide extended and more versatile life and better performance in terms of cushioning and spring.

2. Discussion of the Related Art

Athletic shoes, such as those designed for running, tennis, basketball, cross-training, biking, walking, and other forms of exercise, typically include a laminated sole attached to a soft and pliable upper. The sole usually includes an abrasion-resistant, rubber outsole attached to a cushioning midsole usually made of polyurethane, ethylene vinyl acetate (EVA), or a rubber compound.

One of the principal problems associated with athletic shoes is wear to both the outsole and midsole. A user rarely has a choice of running or playing surfaces, and asphalt and other abrasive surfaces take a tremendous toll on the outsole. This problem is exacerbated by the fact that, with the exception of the tennis shoe, the most pronounced outsole wear for most users, on running shoes in particular, occurs principally in two places: the outer periphery of the heel and the ball of the foot, with heel wear being, by far, a more acute problem because of the great force placed on the heel during the gait cycle. In fact, the heel typically wears out much faster than the rest of the athletic shoe, thus requiring replacement of the entire shoe even though the bulk of the shoe is still in satisfactory condition.

Midsole wear, on the other hand, results not from abrasive forces, but from repeated compression of the resilient material forming the midsole due to the large force exerted on it during use, thereby causing it to lose its cushioning effect. Midsole compression is also the worst in the heel area, particularly the outer periphery of the heel directly above the outsole wear spot and the area directly under the user's calcaneus or heel bone.

Despite higher prices and increased specialization, no one has yet addressed heel wear problems in an effective way. To date, there is nothing in the art to address the combined problems of midsole compression and outsole wear in athletic shoes, and these problems remain especially severe in the heel area of such shoes.

Designs are known that specify the replacement of the entire outsole of a shoe. Examples include those disclosed in U.S. Pat. Nos. 4,745,693, 4,377,042 and 4,267,650. These concepts are impractical for most applications, however, especially athletic shoes, for several reasons. First, tight adherence between the sole and the shoe is difficult to achieve, particularly around the periphery of the sole. Second, replacement of the entire sole is unnecessary based upon typical wear patterns in athletic shoes. Third, replacing an entire sole is or would be more expensive than replacing simply the worn elements, a factor which is compounded if a replaceable, full-length sole for every men's and women's shoe size is to be produced. Finally, it would appear that the heel section, in particular, has entirely different needs and requirements from the rest of the shoe sole which derive in substantial part from its rate of deterioration.

Other designs, which are principally directed to shoes having a relatively hard heel and outsole (e.g., dress shoes), disclose rear soles that are detachable and which can be rotated when a portion of the rear sole becomes worn. Such designs, however, have never caught on in the marketplace because it is simply too easy and relatively inexpensive to have the entire heel on such footwear replaced at a commercial shoe repair shop.

It is difficult to adapt such "dress shoe" designs to athletic shoes for various reasons. One reason is that the soft, resilient materials utilized in athletic shoe soles make it extremely difficult to devise a mechanism for detachably securing heel elements to each other without adversely affecting the cushioning and other desired properties of the shoe. On the other hand, utilization of hard materials in athletic shoes tends to increase weight and decrease comfort and performance.

For example, U.S. Pat. No. 1,439,758 to Redman discloses a detachable rear sole that is secured to a heel of the shoe with a center screw that penetrates the bottom of the rear sole and which is screwed into the bottom of the heel of the shoe. Such a design cannot be used in athletic shoes because the center screw would detrimentally affect the cushioning properties of the resilient midsole and may possibly be forced into the heel of the user when the midsole is compressed during use. Furthermore, a center screw does little for peripheral adherence of the sole to the shoe heel in the case of resilient materials.

Another truism in the athletic shoe industry is that, while cushioning has received a lot of attention, spring has received very little, despite the fact that materials like graphite and various forms of graphite composite possess the proper characteristics for spring enhancement without increasing weight. One reason may be the perceived tendency of graphite or graphite composite to crack under stress. Yet another reason may be the increased cost associated with such materials. Yet another reason may be that the tremendous variation in body weight and spring preference of would-be users makes it commercially unfeasible to mass-market athletic shoes with graphite spring enhancement, given the countless options that would have to be offered with each shoe size. Since heel spring is largely ignored, it goes without saying that spring options are also non-existent.

Also absent from the marketplace are truly multi-purpose athletic shoes. Notwithstanding a few "run-walk," "aerobic-run," and all-court models, the unmistakable commercial trend appears to be increased specialization, with no apparent industry awareness of the fact that the use and function of an athletic shoe can be changed dramatically if it is simply given interchangeable rear soles. Similarly, no athletic shoe manufacturer has yet to offer varying heel cushioning firmness in each shoe size, despite the fact that consumer body weight for each shoe size spans a huge spectrum. While a few manufacturers offer width options in shoe sizes, varying firmness of cushioning in a single model or shoe size is nonexistent in the marketplace.

SUMMARY OF THE INVENTION

The present invention is directed to a shoe that substantially obviates one or more of the needs or problems due to limitations and disadvantages of the related art.

Additional features and advantages of the invention will be set forth in the description which follows, and in part will

be apparent from the description, or may be learned by practice of the invention. The objectives and other advantages of the invention will be realized and attained by the system particularly pointed out in the written description and claims, as well as the appended drawings.

To achieve these and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, the shoe includes an upper having a heel region and rear sole support attached to the heel region of the upper. The rear sole support includes a base, a first wall extending downwardly from the base and having a first groove, and a second downwardly extending wall opposite the first wall and having a second groove facing the first groove. A rear sole is detachably secured to the rear sole support with a mounting member attached to the rear sole and including at least one rim for engaging the first and second grooves. A locking member engages the rear sole support and one of the rear sole and mounting member to prevent rotation of the rear sole relative to the rear sole support during use. It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of one embodiment of a shoe of the present invention.

FIG. **2** is an exploded perspective view of the heel structure for the shoe shown in FIG. **1**.

FIG. **3** is a perspective view of a rear sole support for the heel structure shown in FIG. **2**.

FIG. **4** is a perspective view showing the underside of the rear sole support shown in FIG. **3**.

FIG. **5** is a perspective view of another embodiment of the shoe of the present invention.

FIG. **6** is a perspective view of a rear sole support for the shoe shown in FIG. **5**.

FIG. **7** is a perspective view showing the underside of the rear sole support shown in FIG. **6**.

FIG. **8** is a side view of a rear sole for the heel structure shown in FIG. **2**.

FIG. **9** is a perspective view showing the underside of the rear sole shown in FIG. **8**.

FIGS. **10**A-C are bottom views showing alternative ground-engaging surfaces for the rear sole shown in FIG. **8**.

FIG. **11** is a side view of a mounting member for the heel structure shown in FIG. **2**.

FIG. **12** is a perspective view of a locking member for the heel structure shown in FIG. **2**.

FIG. **13** is a perspective view showing the opposite side of the locking member shown in FIG. **12**.

FIGS. **14**A–C are top, perspective, and side views, respectively, of a flexible plate for the heel structure shown in FIG. **2**.

FIGS. **15**A-C are top, perspective, and side views, respectively, of another embodiment of a flexible plate for use in the heel structure shown in FIG. **2**.

FIGS. **16**A and **16**B are top and side views, respectively, of another embodiment of the flexible plate for use in the heel structure shown in FIG. **2**.

FIG. **17** is an exploded perspective view of another embodiment of the heel structure of the present invention.

FIG. **18** is a perspective view of a mounting member for the heel structure shown in FIG. **17**.

FIGS. **19**A and **19**B are perspective views of a locking member for the heel structure shown in FIG. **17**.

FIG. **20** is an exploded perspective view of another embodiment of the heel structure of the present invention.

FIG. **21** is an exploded perspective view of another embodiment of the heel structure of the present invention.

FIG. **22** is a perspective view of several of the heel components shown in FIG. **21**.

FIGS. **23**A-C are top, side, and bottom views, respectively, of outsole segments for the heel structure shown in FIG. **21**.

FIG. **24** is an exploded perspective view of another embodiment of the heel structure of the present invention.

FIG. **25** is a perspective view of another embodiment of a rear sole for use with the shoe of the present invention.

FIG. **26** is an exploded perspective view of another embodiment of a heel structure of the present invention.

FIGS. **27**A and **27**B are side and front views, respectively, of a wafer for use in the heel structure shown in FIG. **26**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the present preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference characters will be used throughout the drawings to refer to the same or like parts.

FIG. **1** illustrates an embodiment of the shoe of the present invention. The shoe, designated generally as **20**, is an athletic shoe principally designed for running, walking, basketball, tennis, and other forms of exercise.

As shown in FIG. **1**, shoe **20** includes an upper **22**, which is that portion of the shoe that covers the upper portion of the user's foot. The upper may be made of leather, a synthetic material, or any combination of materials well known in the art.

A forward sole **24** is attached to the forefoot region of the upper. The forward sole is a lightweight structure that provides cushioning to the forefoot region, and may include an abrasion-resistant rubber outsole laminated to a softer, elastomeric midsole layer. The forward sole is attached to the upper in a conventional manner, typically by injection molding, stitching or gluing.

In some conventional shoes, the forward sole (simply referred to in the industry as a "sole") would extend from the forefoot region to the rear edge of the heel. In other conventional models, portions of the outsole and/or midsole are reduced or eliminated in certain non-stress areas, such as the arch area, to reduce weight. However, in a radical departure from conventional shoes, the shoe of the present invention incorporates a heel structure, including a detachable rear sole, that significantly alleviates heel wear problems associated with conventional soles and provides enhanced cushioning and/or spring.

An embodiment of the heel structure is shown in FIGS. **1** and **2** and includes a rear sole support **26** attached to the heel region of the upper **22**, a rear sole **28** detachably secured to the rear sole support **26**, a mounting member **60** for detachably securing the rear sole **28** to the rear sole support **26**, and locking members **90** for preventing rotation of the rear sole

28 relative to the rear sole support 26 during use. In addition, the heel structure may include a flexible plate 80 for providing spring to the heel of the user and reducing wear caused by midsole compression.

As shown in FIGS. 3 and 4, the rear sole support 26 includes a substantially oval or elliptically-shaped base 30, with somewhat flattened, medial and lateral sides, having a top surface that is attached to the upper by stitching, gluing, or other conventional means. The shape of such base is not limited, and could be circular, polygonal, or any variation of the foregoing. A front wall 32 extends downwardly from a front edge of the base 30, and a rear wall 38 extends downwardly from a rear edge of the base 30. Together, the front and rear walls define a recess that, as later described, receives means for detachably securing the rear sole to the rear sole support.

The front wall 32 includes a lip 34 turned toward the recess, with lip 34 and the recess side of wall 32 defining an arc-shaped front groove. The rear wall 38 includes a lip 40 turned toward the recess, with lip 40 and the recess side of wall 38 defining an arc-shaped rear groove otherwise substantially identical to and facing the front groove. The front and rear grooves have the same radius of curvature and together may constitute arcs of a common circle. At least one, and preferably both, of the front and rear grooves disclosed in FIG. 4 (and all drawings that disclose front and rear grooves), define a circular arc that is less than 180°. As shown in all of such drawings, both of such circular arcs also may substantially traverse the rear sole support 26 from its lateral to its medial side. The front and rear grooves may also be shaped to define arcs of a common circle having a diameter greater than the width of the rear sole support 26 or mounting member 60 or rear sole 28 or even the heel region of the upper 22. The front and rear walls may be flush with the outer edge of base 30 and are spaced from each other on the medial and lateral sides of the base by a distance X, as shown in FIG. 4, which may be slightly greater than the width of the rear sole support 26 or mounting member 60 or rear sole 28.

The rear sole support also has a central opening 36 directly below the heel region of the upper. This central opening, which may be circular, oval, or virtually any polygonal shape, allows the heel of the user to be cushioned by the rear sole attached to the rear sole support or by the flexible plate 80, instead of the firm material comprising the rear sole support.

The rear sole support may be composed of hard plastic, such as a durable plastic manufactured under the name PEBAX™, graphite, a graphite composite, or other material having sufficient rigidity and strength to securely engage the rear sole attaching mechanism (discussed below). Injection molding or other conventional techniques may be used to form the rear sole support.

The rear sole support 26 may also include a heel counter 44, as shown in FIG. 3, for providing lateral stabilization to the user's heel. The heel counter extends upwardly from the edge of the base 30 in a contoured fashion and is preferably made of the same material as, and integral with, the rear sole support through injection molding or other conventional techniques.

As shown in FIGS. 1–4, an arch bridge 46 may generally extend from the base 30 of the rear sole support to the forward sole for supporting the arch region of the foot. The arch bridge 46 is an optional feature composed of a firm, lightweight material. The arch bridge 46 is attached to the upper 22 and forward sole 24 by gluing or other conventional methods. The arch bridge 46 also may be composed of the same material as the rear sole support or a more flexible material and may be made integral with the rear sole support. Such one-piece construction of the arch bridge together with the rear sole support solves a major problem, and that is the tendency of an athletic shoe of conventional "full body" arch construction to curl or twist at the juncture of the hard rear sole support and the resilient forward sole. It also reduces the weight of the shoe by reducing or eliminating the midsole material, e.g., polyurethane or EVA, that would normally occupy the arch area of the shoe.

The rear sole support, heel counter, and arch bridge need not be made of a solid material. Holes or spaces may be created, at the time of manufacture, throughout the structure to decrease weight without diminishing strength.

As an alternative to the arch bridge 46, the rear sole support 26 in all of the embodiments may include upper and lower horizontal walls 144 and 145, as shown in FIGS. 5–7, extending from, and preferably integrated with, front wall 32. In this embodiment, the forward sole 24 extends into the arch region and is sandwiched between upper and lower walls 144 and 145 and against front wall 32. It may then be further secured by gluing. As a further alternative, the rear portion of the forward sole may simply extend to the rear sole support, without upper and lower walls 144 and 145, and be glued to the front wall 32. Alternatively, the rear sole support 26 could have one wall like either 144 or 145 extending from and preferably integrated with it, but not both walls; or posts, rods, or other members, substantially parallel to the ground, could be substituted for walls and may extend from and be integrated with front wall 32 into or along the surface of the midsole or outsole material in the forward sole and then secured by gluing. Other means may be employed as an alternative to the arch bridge 46. An advantage to combining the rear sole support with walls 144 and/or 145, or eliminating both of such walls entirely, and all other alternatives to the integral arch bridge, is that such options, unlike the integral arch bridge, permit manufacture of only one rear sole support suitable for either the left or right shoe, thus decreasing manufacturing costs.

The heel structure shown in FIG. 2 also includes a rear sole 28 detachably secured to the rear sole support. As shown in FIGS. 8 and 9, rear sole 28 may include a ground-engaging outsole 48 laminated to a midsole 50, which may be more resilient than the outsole, with both the outsole and midsole being more resilient than the rear sole support. The outsole, which may be composed of a rubber compound, provides abrasion resistance and some cushioning, while the midsole, which may be composed of a more resilient, elastomeric material such as polyurethane, ethylene vinyl acetate (EVA), HYTREL™ (made by E.I. DuPont de Nemours & Co.), or other materials well known in the art, primarily provides cushioning to the heel during heel strike. Optionally, the rear sole could be comprised of a single homogenous material, or any number of layers or combinations of materials, including a material comprising air encapsulating tubes disclosed, for example, in U.S. Pat. No. 5,005,300.

The outsole 48 may be planar or non-planar. Preferably, the outsole, particularly on running shoe models, includes one or more tapered or beveled segments 52, as shown in FIG. 8, which when located at the rear of the shoe will soften and/or align heel strike during the gait cycle. The beveled segments 52 may be located at the front and rear portions of the rear sole, as shown in FIG. 10A, slightly offset from the front and rear portions, as shown in FIGS. 10B and 10C, or at any other location, depending on the preference of the

user or any heel strike or wear pattern. The beveled segments **52** may also be aligned on a "special order" basis to deal with particular pronation or supination characteristics of the user.

As shown in FIG. **9**, rear sole **28** is elliptical or oval in shape, with somewhat flattened medial and lateral sides, with its length along the major axis of the shoe (when attached to the rear sole support and ready for use) being greater than its lateral width. As a result, the rear sole has a greater ground-engaging surface than if it were circular or equilaterally polygonal. Such increased ground-engaging surface provides greater stability, particularly if multiple or large beveled segments are used. However, the shape of the rear sole **28** may also be circular, polygonal, or otherwise. Rear sole **28** may or may not feature a hole in its center as shown in FIG. **9**, and preferably should not exist if flexible plate **80** (later discussed) is not used.

Rear sole **28** is detachably secured to the rear sole support **26** with a mounting member **60**. As shown in FIGS. **2** and **11**, mounting member **60** has a base layer **62** that is affixed to the top surface of the rear sole **28** with adhesive or other conventional means that will not degrade the cushioning/spring properties of the rear sole. There is an engaging layer **64** above base layer **62** and notch layer **74A**. Lateral sides **66** each contain protrusions **68** with bulbous ends. Front and rear ends **70** of the engaging layer **64** include circular arc-shaped rims **72** having substantially the same radius of curvature as the front and rear grooves of the rear sole support and engage the front and rear grooves of the rear sole support.

To attach the rear sole to the rear sole support, the rear sole, with the mounting member **60** attached (and, optionally, with a flexible plate **80**, discussed later, supported on the mounting member **60**), is positioned relative to the rear sole support so that the front and rear rims of the mounting member are rotated in a circular manner no more than about 90°, about axis Y from their positions shown in FIG. **2**. The mounting member is centered between the front and rear grooves, then pressed against the bottom of the base **30** and rotated less than 180°, and generally no more than about 90° (clockwise or counterclockwise), so that rims **72** fully engage the front and rear grooves of the rear sole support defined by lips **34** and **40** seen in FIG. **4**. When the rear portion of the rear sole becomes worn, the rear sole can be rotated in a circular manner, 180° so that the worn rear portion now faces toward the front of the shoe and occupies an area somewhat forward of the calcaneus where little or no weight of the user is applied. When the rotated rear portion of the rear sole also becomes worn, the rear sole may be detached and exchanged with the rear sole of the shoe, since wear patterns of left and right heels are typically opposite. The rear sole may also be discarded and replaced with a new one with or without any rotation or exchange between left and right shoe.

The mounting member **60** may be made of any number of hard, lightweight materials that provide sufficient strength and rigidity to firmly engage the rear sole support, and support the flexible plate **80** if used. Examples of such materials include: hard plastic, PEBAX™; HYTREL™ in its hard format, graphite, and graphite, graphite/fiberglass, and fiberglass composites. Hardness of the mounting member may in fact be especially important if flexible plate **80** is used, because the peripheral edges of such plate need to press against a firm foundation of the central portion of such plate is to properly deflect under the weight of the user's foot and impart spring to the user's gait cycle. In any event, the mounting plate material is generally stiffer than the materials used for the rear sole midsole and outsole.

Base layer **62** may be entirely eliminated from the mounting member **60** shown in FIG. **2**, in which case the periphery of the top surface of rear sole **28** presses tightly against lips **34** and **40** of the rear sole support when engaged.

To prevent the rear sole from rotating relative to the rear sole support once engaged with each other, locking members **90** lock the mounting member to the rear sole support at the appropriate orientation. As shown in FIGS. **12** and **13**, locking member **90** includes a base **92** with a substantially planar inner surface **94** and an outer surface **96** contoured according to the sides of the rear sole support when attached thereto. A pair of L-shaped arms **98** extend from the base **92** (preferably from its top, e.g., from the external surface of the heel counter) and engage opposed openings **42** (FIG. **2**) in the rear sole support to pivotally attach the locking member **90** to the rear sole support. Openings **42** may also be formed in the heel region of the upper. When attached to the rear sole support, the locking members occupy the spaces (having a length X as shown in FIG. **4**) between the front and rear walls of the rear sole support, as shown in FIG. **1**.

Apertures **100** are formed in the base **92** for receiving the protrusions **68** of mounting member **60**. The apertures have a small opening adjacent surface **94**, then expand in diameter within the base to a larger opening near surface **96** to accommodate the bulbous ends of the protrusions **68**. As a result, the protrusions "snap" into the apertures **100** to lock the locking members in position. In addition, projections **102** extend inwardly from opposite ends of base **92** and engage notches **74** in the mounting member between the front and rear ends and the lateral sides (FIGS. **2** and **11**) to prevent rotation of the rear sole when the locking members are in the position shown in FIG. **1**.

As shown in FIG. **2**, mounting member **60** includes slots **76** for supporting a flexible plate **80** between the rear sole and the heel portion of the upper so that a portion of plate **80** is exposed through central opening **36**. The flexible plate, which may be made of a graphite composite or other stiff, but flexible, material, reduces heel-center midsole compression and provides spring to the user. The flexible plate is, of course, stiffer than the materials used for the outsole or midsole, but must be sufficiently flexible so as to not detrimentally affect cushioning of the user's heel. A graphite or graphite/fiberglass composite, including carbon or carbon and graphite fibers woven in an acrylic or resin base, such as those manufactured by Biomechanical Composites Co. of Camarillo, Calif., may be used.

As shown in FIGS. **14A-C**, flexible plate **80** includes front and rear edges **82** and **84** that are supported by slots **76** (see FIG. **2**) in the mounting member. The flexible plate may have a substantially convex upper surface that curves upwardly between the front and rear edges to an apex **86**, which is preferably located below the calcaneus of the user when the rear sole is attached to the rear sole support. An aperture **88** may be provided at the apex **86** to increase spring.

The plate may also be flat or concave, and may be substantially hour glass-shaped, as shown in FIGS. **14A-C**, or H-shaped, as is the plate **180** shown in FIGS. **15A-C**. Other shapes are also contemplated as long as such shapes provide spring and reduce midsole compression of the rear sole. For example, FIGS. **16A** and **B** show another hour glass-shaped flexible plate **280** with discrete upper and lower sections **282** and **284**.

When the flexible plate is used, the rear sole may be devoid of material in its center, as shown in FIG. **2**, to reduce the weight of the rear sole. If the center is devoid of material,

a thin horizontal membrane (not shown), with or without a flanged edge, composed of plastic or other suitable material may be inserted into the void and attached to the walls of the void, by compression fit or otherwise, to seal the void and prevent moisture or debris from entering or collecting therein.

Apex **86** is located, in FIGS. 14C and 15C, slightly to the rear of the center of the major axis of plate **80**, so as to be positioned more directly beneath the center of the calcaneus. Thus, it will be necessary to remove and rotate plate **80** by 180 on an axis perpendicular to the major axis of the shoe when the rear sole is rotated, in order to keep the apex positioned directly beneath the calcaneus. However, plate **80** may be formed with the apex in any position to suit a user's preference. It may even be placed in the exact center of plate **80** so as to obviate the need for plate rotation when the rear sole is rotated.

Flexible plate **80** provides spring to the user's gait cycle in the following manner. During heel strike in the gait cycle, the user's heel provides a downward force against the plate. Since the peripheral edges of the plate are firmly supported by the mounting member, the interior portion of the plate deflects downwardly relative to the peripheral edges. As the force is lessened (with the user's weight being transferred to the other foot) the deflected portion of the plate, due to its elastic characteristics, will return to its original shape, thereby providing an upward spring force to the user's heel. Such spring effect will also occur whenever a force is otherwise applied to and then removed from the flexible plate (e.g., jumping off one foot, or jumping from both feet simultaneously).

The removability of the flexible plate allows the use of several different types of flexible plates of varying stiffness or composition. Thus, flexible plate designs and characteristics can be adapted according to the weight of the user, the ability of the user, the type of exercise or use involved, or the amount of spring desired in the heel of the shoe. Removability also permits easy replacement of the plate should deterioration occur, a concern in the case of virtually any truly spring-enhancing plate material.

The heel structure embodiment shown in FIG. 2 is but one of many embodiments contemplated by the present invention. While further embodiments are discussed below, additional embodiments are possible and within the scope of the invention. Unless otherwise noted, the structure, material composition, and characteristics of the heel components shown in FIGS. 1 and 2 apply to all of the embodiments.

One such embodiment is shown in FIGS. 17–19B. In this embodiment, rear sole support **126** is substantially identical to rear sole support **26** shown in FIG. 2 except that it has horizontal grooves **128** on the exterior surfaces of each of the downwardly extending walls and no holes **42**. The mounting member **160** shown in FIG. 17 is also identical to mounting member **60** shown in FIG. 2 except that protrusions **168** do not have bulbous ends.

Locking members **190** differ from those shown in FIG. 2 in that the hinges are eliminated. Instead, the exterior surfaces of each of the locking members **190** have a horizontal groove **192** that aligns with the exterior grooves **128** formed on the rear sole support. In addition, apertures **194** (FIG. 19A) are cylindrical in shape and need not have expanded interior portions since the protrusions **168** have no bulbous ends.

To lock the locking members in place, an elastic band **110** is stretched and fitted within the grooves **128** on the rear sole support and grooves **192** on the locking members. The elastic band **110** may be a separate component completely removable from the rear sole support, as shown in FIG. 17, or permanently secured to the rear sole support by, for example, enclosing one of the grooves **128** after the elastic band has been inserted therein. Also, the band may be pushed or rolled upward above grooves **128** on the rear sole support prior to detaching locking members **190**, and then simply rolled downward to return to an in-groove position following reattachment. As a further option, the elastic band may be a removable or permanently attached strap fitted within the grooves and having opposing ends that may be latched together like a belt or ski boot latch.

As a further alternative (not shown), a U-shaped connector having opposite ends permanently attached to one end of both locking members **90** may be removably or permanently secured to the outer surface of either the front or rear wall of the rear sole support, as a substitute for the system involving hinges **98** on locking members **90**. The elastic band and other alternatives to the hinged locking member can be used in all of the embodiments of the invention.

If a flexible plate is not desired, the embodiment shown in FIG. **20** may be used to supply more conventional midsole cushioning. In this embodiment, the mounting member **260** is identical to the mounting member **60** shown in FIG. 2 except that the base layer **62** and slots **76** are eliminated. It should again be noted that the base layer **62** is an optional feature in all of the mounting member embodiments. In place of the rear sole **28** shown in FIG. 2, a rear sole **200** has an abrasion-resistant outsole **202** laminated to a midsole layer **204**. On top of this midsole layer **204** are two additional midsole layers **206** and **208**, each layer being smaller than the layer upon which it rests, with midsole layer **208** sized to fit within the central opening **36** in the rear sole support **26**. Midsole layers **206** and **208** may comprise two separate pieces laminated together or a single piece molded or otherwise shaped to have two regions as shown.

In this embodiment, the mounting member **260** is adhered by gluing or other means to the top of the midsole layer **204** such that it surrounds and abuts against the sides of midsole layer **206**. It may be further secured to the sides of midsole layer **206** by gluing or other means. The manner of attaching the rear sole and mounting member to the rear sole support is identical to that described with respect to the embodiment shown in FIG. 2. In addition, the top midsole layer **208** may, but need not be, made circular to facilitate rotation of the rear sole when the midsole layer **208** is pressed into the central opening **36**. Alternatively, this layer may be severed from layer **206** and placed in opening **36** with the shoe in an inverted position. This may make installation easier if layer **208** is oval in shape, like opening **36**. It also permits replacement of layer **208**, should its cushioning properties deteriorate at a faster rate than the rest of the rear sole. Of course, this step would be accomplished before engagement of mounting member **260** with rear sole support **26**, which similarly could be accomplished while the shoe is in an inverted position in order that layer **208** does not fall out or dislodge during installation.

It should be noted that layers **204**, **206**, and **208** may be made of different cushioning materials, including without limitation air-filled chambers, gell-filled chambers, EVA or polyurethane, or any combinations thereof.

The rear sole support is designed to accommodate a variety of rear sole configurations, which vary according to the activity involved, the weight of the user, and the cushioning and/or spring desired by the user. Although additional rear sole configurations are discussed below, many other rear

sole configurations may be used in conjunction with the rear sole support **26**.

One such example is shown in FIGS. **21** and **22**. In this embodiment, a rear sole **300** is a U-shaped member having substantially parallel walls **302** and **304** joined by a bend **305**. The member is composed of a stiff, but flexible, material that will provide spring to the heel of the user without sacrificing comfort. Materials such as those disclosed with respect to the flexible plate **80** may be used for the rear sole **300**.

Two layers of resilient midsole material **206** and **208**, which may be more resilient than the U-shaped member, are secured to the top of wall **302** by gluing or other means to provide cushioning to the heel of the user, and mounting member **260** is glued or otherwise attached to the top surface of top wall **302** to surround and abut against the sidewall of midsole layer **206**. It may also be attached to the side wall of layer **206** by gluing or other means. The mounting member may also be molded to the rear sole **300** as a one-piece structure. The midsole layers **206** and **208**, the mounting member **260**, and the rear sole support **26** (as well as optional features) are identical to those shown in FIG. **20**, and the manner and options for attaching the rear sole and mounting member to the rear sole support is the same, including without limitation the option of severing and separately installing layer **208**.

To protect the bottom ground-engaging surface of the U-shaped member and to provide cushioning, the rear sole may include an abrasion-resistant outsole which may be more resilient than the U-shaped member. As shown in FIG. **21**, the bottom wall **304** of the rear sole **300** includes holes **306** through which removable outsole segments **308** are inserted. The outsole segments **308**, which may be made of a rubber compound or other material typically used for outsole material, provide an abrasion-resistant layer for protecting the bottom surface of wall **304**. As shown in FIGS. **23A–C**, the outsole segments have a substantially conically-shaped top portion **316**, a cylindrical middle portion **318**, and a rounded ground-engaging portion **320**. The conically-shaped portion **316** snaps into openings **306**, and the bottom of the conically-shaped portion acts to retain the outsole segments in the openings. Alternatively, a one-piece outsole layer may be attached to the bottom surface of wall **304**, utilizing openings **306** and segments **308**, or eliminating both and utilizing gluing or some other means instead. Such outsole layer may then be permanent or removable.

The rear sole **300** provides spring to the heel of the user in the following manner. When the heel of the user strikes the ground, wall **304** will deflect toward wall **302**. Since the material is elastic, energy stored in bend **305** and wall **304** during deflection will spring bend **305** and wall **304** back to their original position as weight is shifted, thereby providing a spring effect to the user's heel. Stiffening members **312** or **312A** are optional elements that may be used to increase the spring generated by the rear sole **300**. The stiffening members include protrusions **314** that engage apertures **310** in the bend of the rear sole **300**. Alternatively, bottom wall **304** (shown with large hole in middle) may be solid to increase spring or may be tent-shaped as shown in FIG. **25** to further increase spring, with or without a stiffening member **412**.

Flexible plate **80** may also be used in conjunction with a rear sole very similar to that shown in FIG. **21**. As shown in FIG. **24**, rear sole **400** is identical to rear sole **300** shown in FIG. **21** except that it has an optional opening in the top wall to reduce the weight of the rear sole and allow additional space within which flexible plate **80** may flex. Alternatively, the bottom wall may be solid to increase spring or may be tent-shaped as shown in FIG. **25** to further increase spring, with or without a stiffening member **412**. Mounting member **360** is similar to that shown in FIG. **2** except that the base **62** is deleted. Again, flexible plate **80** rests in slots **376** formed in the moulding member and is exposed to the heel region of the upper via the central opening **36** in the rear sole support **26**.

Another rear sole option is shown in FIG. **25**. In this embodiment, rear sole **500** is identical to rear sole **400** shown in FIG. **24** except that it has a "tent-like" wall **506** extending from the bottom wall **504** toward top wall **502**. Wall **506** may have a top surface **588**, or may be devoid of material at this location. Wall **506** has the effect of increasing stiffness and, therefore, provides more spring than that of the rear sole **400** as shown. A stiffening member **412** may also be used to further increase spring. Stiffening member **412** is identical to member **312** shown in FIG. **24** except that it has a slanted wall **413** to complement and press against the front sloped surface of wall **506**. Top wall **502** may have a central opening, as shown in FIG. **25**, or may be solid, such as wall **302** shown in FIG. **21**. Wall **506** may be used in any of the U-shaped rear sole embodiments.

Finally, an optional wafer **600**, usable in combination with any of the above embodiments incorporating a flexible plate, is disclosed in FIGS. **26–27B**. As shown in FIG. **26**, wafer **600** is disclosed in conjunction with the heel structure shown in FIG. **2**. Wafer **600** is placed on the top surface of flexible plate that it is exposed to the heel region of the upper (not shown) via central opening **36** of rear sole support **26**. Wafer **600** is made of any suitable materials, such as those materials disclosed for the midsole layer or outsole layer of rear sole **28**, that provide cushioning to the heel of the user and which are more resilient than the flexible plate.

As shown in FIGS. **27A** and **27B**, wafer **600** includes knobs **602** and **604** that snap engage with corresponding openings **382** and **384** (see FIG. **26**) in flexible plate **380**. Although two knobs are shown in this embodiment, any number of knobs may be used; in fact, the knobs may be eliminated entirely.

As shown in FIG. **26**, wafer **600** is oval in shape, although any shape is contemplated so long as it provides the desired cushioning to the heel of the user. If desired, the bottom surface **608** of wafer **600** may be concave in order to conform with the curved top surface of flexible plate **380**. The top surface **606** of wafer **600** may also be concave in order to conform with the contours of the heel region of the upper or the user's heel.

The wafer need not be attached to the flexible plate **380**. Instead, the wafer may, for example, be permanently attached to the bottom of the upper, secured within or made integral with a shoe sock liner (not shown), secured to the rear sole support, or attached at any other location that would be capable of cushioning the user's heel.

It will be apparent to those skilled in the art that various modifications and variations can be made in the shoe of the present invention without departing from the scope or spirit of the invention and that certain features of one embodiment may be used interchangeably in other embodiments. By way of example only, the rear sole support/locking member combinations shown in FIGS. **2** and **17** can be used in conjunction with any of the above-described rear sole configurations, and can be used with or without the flexible plate. Similarly, the arch bridge shown in FIGS. **1–4**, upper and lower horizontal walls shown in FIGS. **5–7** and other alternatives to the arch bridge discussed herein may be

employed with any embodiment shown. Thus, it is intended that the present invention cover all possible combinations of the features shown in the different embodiments, as well as modifications and variations of this invention, provided they come within the scope of the claims and their equivalents.

What is claimed is:

1. A shoe comprising:

an upper, and

a rear sole secured below a portion of the upper, the rear sole comprising:

a member having a top wall with a lower surface, the top wall having at least one peripheral edge proximate a medial side of the shoe and at least one peripheral edge proximate a lateral side of the shoe, the peripheral edges of the top wall having a mid-longitudinal axis therebetween, the top wall having an opening beneath the wearer's heel, the mid-longitudinal axis of the peripheral edges of the top wall including a point that is vertically aligned with the approximate center of the opening in the top wall and the approximate center of the wearer's heel, the member having a bottom wall with an upper surface, the bottom wall having at least two portions approximately planar with each other, parallel with the ground, and separated by a gap therebetween, the top wall and the bottom wall each having a forward region and a rearward region, the forward regions of the top and bottom walls being connected at a closed end by a curved wall; the top, bottom, and curved walls being integral, the rearward regions of the top and bottom walls being oriented toward a back of the shoe, at least a portion of the top and bottom walls being spaced a predetermined distance from each other such that during the wearers gait cycle when the shoe is in contact with the ground the predetermined distance between the at least a portion of the top and bottom walls is reduced;

at least one element positioned between at least a portion of the top wall and at least a portion of the bottom wall, the at least one element having at least one interior sidewall;

a void located beneath the opening in the top wall defined at least in part by the at least one interior sidewall of the at least one element, at least a portion of the void being vertically aligned with the approximate center of the opening in ...p top wall;

at least one opening on at least one of the medial and lateral sides of the shoe, the opening being in communication with the void; and

a bottom surface that is at least in part ground-engaging.

2. The shoe of claim 1, wherein a cross-sectional profile of the top and bottom walls that are connected at the closed end by the curved wall is generally in a recumbent U-shape.

3. The shoe of claim 1, wherein the reduced predetermined distance between the at least a portion of the top and bottom walls results from the at least a portion of one of the top and bottom walls deflecting toward the other in a substantially vertical direction.

4. The shoe of claim 1, wherein the reduced predetermined distance between the at least a portion of the top and bottom walls results from the at least a portion of the top wall deflecting toward the ground in a substantially vertical direction.

5. The shoe of claim 1, wherein the top wall has at least one peripheral edge proximate the rear of the shoe.

6. The shoe of claim 5, wherein the at least one peripheral edge of the top wall proximate one of the medial side of the shoe, the lateral side of the shoe, and the rear of the shoe is visible from outside the shoes.

7. The shoe of claim 1, wherein the bottom wall has at least one peripheral edge proximate one of the medial side of the shoe and the lateral side of the shoe.

8. The shoe of claim 7, wherein the at least one peripheral edge of the bottom wall is at least in part visible from outside the shoe.

9. The shoe of claim 1, wherein one of the at least two portions of the bottom wall has at least one peripheral edge proximate the medial side of the shoe and another of the at least two portions of the bottom wall has at least one peripheral edge proximate the lateral side of the shoe, the peripheral edges being approximately parallel with each other.

10. The shoe of claim 9, wherein the peripheral edges of the at least two portions of the bottom wall proximate the medial side and lateral side of the shoe are at least in part visible from outside the shoe.

11. The shoe of claim 9, wherein each of the at least two portions of the bottom wall has an interior edge, the interior edges of the at least two portions of the bottom wall being substantially planar with each other and substantially parallel with the ground.

12. The shoe of claim 1, wherein the curved wall has at least one peripheral edge proximate one of the medial side of the shoe and the lateral side of the shoe.

13. The shoe of claim 12, wherein the at least one peripheral edge of the curved wall is at least in part visible from outside the shoe.

14. The shoe of claim 1, wherein the curved wall has a mid-longitudinal axis, with an opening along the mid-longitudinal axis of the curved wall.

15. The shoe of claim 1, wherein the curved wall is approximately perpendicular to the major longitudinal axis of the shoe.

16. The shoe of claim 1, further comprising a cushion positioned beneath the wearer's heel and above at least a portion of the top wall of the member, the cushion and the top wall each being made of a material, the material of the cushion being more resilient than the material of the top wall.

17. The shoe of claim 16, wherein the cushion has an upper surface conforming in shape to the bottom surface of the wearer's heel.

18. The shoe of claim 17, wherein the cushion is located at least in part beneath the approximate center of the wearer's heel.

19. The shoe of claim 18, wherein the cushion is located beneath and adjacent at least a portion of the upper.

20. The shoe of claim 1, wherein the opening in the top wall is visible at least in part through the at least one opening on at least one of the medial and lateral sides of the shoe.

21. The shoe of claim 1, wherein the lower surface of the top wall is at least in part visible from outside the shoe through the at least one opening on one of the medial and lateral sides of the shoe.

22. The shoe of claim 1, wherein the upper surface of the bottom wall is at least in part visible from outside the shoe through the at least one opening on at least one of the medial and lateral sides of the shoe.

23. The shoe of claim 1, wherein the interior sidewall of the at least one element is at least in part visible from outside the shoe through the at least one opening in one of the medial and lateral sides of the shoe.

24. The shoe of claim 1, wherein the at least one interior sidewall of the at least one element is at least in part visible from outside the shoe.

25. The shoe of claim 1, wherein an entire portion of the top wall over the at least one element is solid.

26. The shoe of claim 1, wherein the bottom surface of the rear sole has a non-ground-engaging portion that is vertically aligned with at least a portion of the opening in the top wall.

27. The shoe of claim 26, wherein the non-ground-engaging portion of the bottom surface of the rear sole is located at least in part between the at least two portions of the bottom wall.

28. The shoe of claim 26, wherein the non-ground-engaging portion of the bottom surface of the rear sole comprises a substantially planar portion and an adjacent portion non-planar with the planar portion.

29. The shoe of claim 26, wherein the non-ground-engaging portion of the bottom surface of the rear sole comprises a tent-shaped portion extending toward the top wall.

30. The shoe of claim 29, wherein the tent-shaped portion extending toward the top wall has at least one sidewall at an angle to the at least in part ground-engaging portion of the bottom surface, the at least one interior sidewall of the at least one element being at an angle to the at least in part ground-engaging portion of the bottom surface, the at least one sidewall of the tent-shaped portion being adjacent the at least one interior sidewall of the at least one element.

31. The shoe of claim 30, wherein the angle of the at least one sidewall of the tent-shaped portion that is adjacent the at least one interior sidewall of the at least one element is approximately the same as the angle of the at least one interior sidewall of the at least one element that is adjacent the at least one sidewall of the tent-shaped portion.

32. The shoe of claim 1, wherein the at least in part ground-engaging portion of the bottom surface is formed of outsole material.

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